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A STUDY OF TEACHER INTERACTIVE DECISION MAKING

by

Ⓒ MICHAEL GEORGE WODLINGER

A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE
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ABSTRACT

This study was designed as an exploratory, naturalistic investigation of a teacher's interactive decision making. Specifically, it focussed upon the characteristics and concomitants of interactive decisions, including (a) types of interactive decisions, (b) antecedents of interactive decisions, (c) information processed during the formulation of interactive decisions, (d) the role of heuristic techniques in decision formulation, and (e) decision rationales.

Ten lessons--3 mathematics, 3 reading, 2 spelling, 1 group discussion, and 1 language arts--were videotaped in a grade 6 classroom. These videotapes formed the foci of discussion for subsequent stimulated recall interviews. During these interviews the teacher provided information and insights concerning her interactive decisions. The information that was recorded during the ten stimulated recall interviews constitutes the data of this study.

A content analysis system was designed that enabled the data to be categorized, quantified, and described. The data were then subjected to two levels of analysis, micro and macro. The micro-analysis was designed to isolate the various characteristics and concomitants of interactive decision making and the macro-analysis to identify global patterns and trends in decision formulation.

The data indicate that (a) a teacher formulates a vast number of interactive decisions during a school day, (b) the incidence of interactive decision formulation appears to vary with the rate and direction of interaction, (c) interactive decisions tend to be instance specific, (d) the information most often used in interactive decision formulation consists of observations of student overt behaviour and estimates of students' states of mind and behaviours, and (e) feedback information is not actively sought following the implementation of interactive decisions. Another important conclusion of this study is that a teacher makes considerable use of heuristic techniques in the formulation of interactive decisions.

The findings and conclusions of this study relate mainly to pre-service and in-service teacher education, educational administration, and educational research. Specifically, they call for:

a. teacher education programs that focus upon decision making in the classroom,

b. a recognition by educational administrators of the teacher as a dynamic decision maker, and

c. the involvement of teachers in educational research not only as subjects but also as investigators of classroom behaviours.

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CHAPTER I

INTRODUCTION

Background To The Study

Decision processes have been of concern to educators for many years (Dewey, 1933; Gagne, 1959; Radford, 1975; Hargreaves, 1979), with much of the early investigation concentrating upon the decision making process in order to develop conceptualizations for prescription (Karvin, 1957; McDonald, 1965; Newell and Simon, 1972). Much of the research, though has concerned random samples of the general population in laboratory settings and little research has been conducted into the decision processes of teachers in their classrooms (Sutcliffe and Whitfield, 1979).

Recently, however, the act of teaching has been characterized as decision behaviour (Bjerstedt, 1969; Bligh, 1972; Shavelson, 1973; Sutcliffe and Whitfield, 1979). Bjerstedt (1969:55), for example, claims that:

> A teacher is in his daily work to a great extent a decision maker in a situation of constant social exchange, where the inability to make a decision at the right moment or inadequacy in social relations can easily have an adverse effect on both the harmony and effectiveness - and perhaps not only for the actual situation but also for the future.

Similarly, Clark and Joyce (1975:1,2) claim that "Decision making is the psychological process that binds . . . aspects of teaching together" and that ". . . consciously and unconsciously teachers make decisions that affect their behavior and that of their students." This view is supported by Mosston (1972:10), who perceives that ". . . teaching behavior is a chain of decision making." However, even though there is a vast body of literature concerning decision theory and decision processes in general, only very recently have researchers embarked upon investigations of teachers' interactive decisions--decisions made during the instructional phase of teaching (Clark and Yinger, 1977). Shavelson (1973:147) has determined that even as late as the early 1970's, ". . . various conceptualizations of the teacher as decision maker had not led to empirical verifications."

In reviewing the literature on educational problem solving and decision making, Oberg (1975:67) has determined that the task of identifying observable indicators of decision making are difficult, in that a mental process is involved, a process that operates internally. Thus, she wrote, "Much of the research on problem solving has avoided this difficulty by focusing on personality or environmental correlates of problem solving behavior rather than on characteristics of the process itself."

Clark and Yinger (1977) report that the earliest studies of teachers' interactive decisions occurred in 1975 (Clark and Joyce, 1975; Marx and Peterson, 1975; Clark and Peterson, 1976) and that only in more recent years, have studies been conducted that have examined interactive decision formulation as a thought process (Marland, 1977; Conners, 1978a; Hargreaves, 1979; and Sutcliffe and Whitfield, 1979). However, a review of the literature has led to the determination that fewer than twenty studies have been conducted that deal specifically with teachers' interactive thought processes. Of these, only nine have examined interactive decision making as one of these processes (Morine and Vallance, 1975; Marx and Peterson, 1976; Clark and Peterson, 1976; Marland, 1977; Cone, 1978; Conners, 1978a; Shavelson, Borko, Cone and Russo, 1978; Hargreaves, 1979; Sutcliffe and Whitfield, 1979). Furthermore, only four studies have dealt exclusively with thought processes involved in interactive decision making. (Clark and Peterson, 1976; Cone, 1978; Hargreaves, 1979; Sutcliffe and Whitfield, 1979)

The foregoing demonstrates that, as yet, few studies have examined teachers' interactive decision making. Thus, in order to provide more information concerning this important teacher behaviour, this study has focussed upon a teacher's interactive decisions.

Need For The Study

Recent literature on teaching stresses the need to examine teachers' interactive decision processes (Mosston, 1972; Clark and Joyce, 1975; Crocker, 1977, 1978; Sutcliffe and Whitfield, 1979). For example, Mosston (1972:10) considers teaching behaviour as a "chain of decision making." He suggests that everything the classroom teacher does and says "is a result of decisions previously made; every act, statement, or question of a teacher's is the consequence of such a decision." In similar vein, Clark and Joyce (1975:4) note that there is a specific need:

1. To identify clearly the kinds of decisions that teachers make during teaching.
2. To identify clearly the kinds of information that teachers use during the formulation of their decisions.
3. To develop a picture of teachers' present decision making practices.
4. To determine the extent to which decision making styles are related to the teaching act and to pupil learning.

Further, Sutcliffe and Whitfield (1979:32,33), in their examination of classroom-based teaching decisions, claim that:

> we need to be able to describe the actual teaching/learning encounter with more sophistication and precision before we can make evaluative judgements about teaching in terms of its effects upon pupil behaviour.

They observe that although there is a need for adequate description to be accumulated before the implementation of teacher education programmes and evaluative judgements of teaching behaviours, these latter are being conducted, "albeit in the absence of much illuminative research."

In the perspective of Educational Administration, there are further imperatives for research into teacher decision making. In the first place, with the increased popularity of such evaluative strategies as "Clinical Supervision" (Cogan, 1973), there is an increasing need for a more complete understanding of teaching behaviours in the classroom. The trend to involve the teacher in the evaluative process has called for a re-examination of the traditional paradigm. Lortie (1975), Crocker (1978), and Eisner (1979), for example, have directed attention away from product criteria to the thought processes in which teachers engage during the formulation of instructional and managerial decisions. In the second place, there is a need for further research into specific elements of the interactive decision process, in order to provide improved rationales for teacher pre-service and inservice education. In this connection, Shavelson and Atwood (1977:136-37) state that:

> Classroom studies of teachers' estimates should be clinical in nature. Individual teachers should be studied intensively in different teaching situations; verbal reports of estimates and cues used in reaching

these estimates would constitute the data.

Clark and Peterson (1976:301), furthermore, claim that a need exists for additional investigation into "teacher perceptions, information processing and behavior." Similarly, Marland (1977:239) recommends that more research be conducted in order to "identify some of the more common features of teachers' information processing." And finally, in discussing the implications of his study of teacher's thoughts, beliefs, and principles, Conners (1978a:307) recommends that further investigation be considered to explore "variations in teacher styles of information processing and the content of the information they process.", for such variations may be related to variations in teacher effectiveness.

Purpose of the Study

In response to this lack of knowledge concerning the interactive decision process this research project had two purposes. First, the study was designed to examine the characteristics and the concomitants of the interactive decision. These characteristics and concomitants include:

a. the types of interactive decisions formulated,

b. the antecedents of these decisions,

c. the information processed during the formulation of interactive decisions,

d. the rationale for these decisions,

e. the role that heuristic techniques play in the formulation of interactive decisions--with regards this focus, attention was placed upon the use of heuristic techniques in teacher estimates of the students' states of mind and behaviour, and on lesson strategies--, and

f. global patterns and trends in teacher interactive decision making.

Second, the study investigated the use of an introspective methodology in the examination of teacher decision making.

Significance Of The Study

The significance of the study is two-fold. First, by focussing upon interactive decisions made by teachers, the findings of the study will increase the present level of knowledge concerning the teacher decision process and may ultimately contribute to the improvement of the teaching-learning process. Second, with the growing pressure upon educational administrators to improve the formative evaluation process, findings from this study may provide valuable input.

Definition Of Major Terms

Although a majority of terms used in this study have been defined in context, major terms are defined as follows:

Decision

A decision is made when a problem requires the individual to make a choice of a particular course of action after the consideration of two or more courses of action.

Decision-Making

Decision-making is the act of selecting from two or more possible courses of action in order to solve a problem.

Interactive Decision

An interactive decision is a decision formulated during the instructional phase of teaching, when the teacher is interacting with his/her students.

Stimulated Recall

Stimulated recall is "a branch of introspective methodology in which audio and/or visual cues are presented to facilitate a subject's recall of the covert mental activity which occurred simultaneously with the presented cue or stimuli." (Conners, 1978a:10)

Stimulus Point

A stimulus point refers to a particular incident recorded on videotape around which discussion is focussed during the stimulated recall interviews.

Decision Antecedent

A decision antecedent is a stimulus that generates within the teacher the need to formulate a decision.

Heuristic

An heuristic is a psychological mechanism by which an individual may organize a body of indefinite or uncertain information for the purpose of formulating an estimate, prediction or judgement (Hammond and Summers, 1972; Kahneman and Tversky, 1972, 1973; Elstein and Shulman, 1975; Slovic, Fischoff and Lichtenstein, 1977). Two types of such mechanisms are recognized--one is characterized by stereotyping and is called a representative heuristic, the other by exaggeration of judgement and is called an availability heuristic.

CHAPTER II: REVIEW OF THE LITERATURE AND RELEVANT RESEARCH

CHAPTER II

REVIEW OF THE LITERATURE AND RELEVANT RESEARCH

Overview

The purpose of this chapter is to review the literature on relevant research into teachers' decision processes in general and interactive decision processes in particular. This review has been organized (a) to examine the evolution of thinking about teachers' decision making, (b) to describe the characteristics and concomitants of teachers' decision processes, (c) to examine teachers' use of heuristics in interactive decision processing and estimate formulation, and (d) to examine various introspective methodologies that are considered appropriate for investigation of teachers' interactive decisions.

Evolution Of Thinking Of Teacher Decision Processes

The evolution of thinking of teacher decision processes may be viewed as falling into two distinct phases of development: the pre-1968 objective, rational phase and the post-1968 subjective, introspective phase. The earlier period of investigation was characterized by a conceptualization of the decision process as a conscious, rational set of behaviours designed to reach the best possible choice for a defined problem (Dewey, 1933; Beal, 1957; Gagne, 1959). A systhesis of these conceptualizations produces a process that consists of:

1. Identification and evaluation of a perceived problem.
2. Generation of alternatives.
3. Obtaining information concerning the alternatives and their possible consequences.
4. Evaluating the selected alternatives in light of established criteria or standards.
5. Selecting a choice of action.
6. Evaluating the choice in light of the actual and preferred outcomes.

Educational writers in this early period conceptualized instruction as a decision process (Miller, Galanter, and Pribram, 1960; Taba and Elzey, 1964; McDonald, 1965; Strasser, 1967). Miller and his colleagues' (1960) Test-Operate-Test-Exit (TOTE) model, operationalized through a series of crucial decisions, assesses to what degree a particular tactic or strategy has been successful in facilitating students' learning. A highly behaviour oriented approach, the TOTE model is akin to a series of programmed decision moments.

By way of contrast, Taba and Elzey's (1964) sequential decision making model orders the development of higher levels of student thought through a series of crucial, cue-based decisions. This highly subjective approach is an attempt to raise the student's level of thought through various stages.

McDonald's (1965) "Cybernetic Model of Human Behaviour" adds support to the claim that instruction is a decision process. In discussing his model, McDonald notes that the teacher, as an active constructor of events, develops teaching tactics in response to various kinds of perceptual and informational cues from the students. Through the observation of student behaviours, the teacher tests the congruity of these tactics with the established lesson or instructional goals and objectives. McDonald (1965:63) views this instructional decision making in a special light, claiming that "each of the decisions that a teacher makes in formulating a teaching plan is a(n) hypothesis about learning."

Strasser's (1967) conceptualization of the instructional process also appears to be an instructional decision process. This model incorporates the elements of (a) teacher planning, (b) teacher initiating behaviour, (c) observation, interpretation, and diagnosis of learner behaviour, and (d) teacher influenced and influencing behaviour. In discussing his model, Strasser (1967:68) observes that "the central directing element of instruction is the lesson strategy and the essence of classroom interactions, the lesson tactic."

All tactics employed by the teacher are composed of two of the elements mentioned above: teacher influenced and influencing behaviours and teacher observations, interpretations, and diagnoses of learner behaviours. Strasser (1967:69) explains that:

> In the light of some previous diagnosis and in terms of explicit goals, a teacher behaves. Simultaneously, he observes the students. Such observations are interpreted in terms of the purposes of the tactic. With this information, diagnoses about continuing or new teacher behaviors are made . . . . This tactical element loop takes shape which involves diagnosing, behaving, observing, and interpreting by the teacher.

Strasser's 'Tactical Element Loop' may be viewed as a decision model.

The Marcus and Wilson (Bowles, 1973:39) 'open management model' also reflects the concept of teaching as a decision process. Bowles believes that instruction is the synthesis of planning, implementation, and reflective decisions made by teachers. Such an approach, Bowles claims, allows for a healthy degree of ambiguity and permits synergistic behaviours.

Toward the end of the 1960's and into the 1970's, the earlier period of thinking on teacher decision making gave way to a new phase: a period of research that has led to a re-examination of the rationality assumption. With the publication of Jackson's (1968) landmark study (Life in Classrooms) research into teacher behaviours embarked upon a new course. Borrowing methodologies from other disciplines, particularly anthropology (Cusick, 1973), educational researchers began to move into the classrooms of North America to record and report upon what actually did occur, rather than conceptualizing what should occur.

Bowles (1973:39), for example, claims that decision making in specific instructional situations results from rapid adjustments to various cues or transmitted pieces of information on an almost intuitive level. This view is supported by Shavelson and Atwood (1977:134) who, in their study of the way in which teachers estimate students' states of mind, note that teachers' classroom decisions follow an intuitive rather than rational model.

Reporting on teachers' decision style during instructional periods, Yinger (1978:2) observes:

> The rapidity and immediacy of the teacher's interaction with pupils in the classroom often precludes the rational-purposeful kind of thinking that is normally asociated with problem solving and decision making.

These criticisms of traditional thinking about decision processes, though, are not new. Newell, Shaw and Simon (1958) and Merrifield, Christensen, Frick and Guilford (1962), for example, note that the stages of decision making are not distinct and that the processes involved in arriving at an action alternative are not necessarily linearly related. Second, doubt has been raised that teachers do in fact enter a conscious alternatives-generating phase during instruction. Clark and Peterson (1976), in their study of teachers' decision processes in both planning and instructional contexts, found that their teachers seldom considered alternatives during a decision moment; they tended to accept the first approach that came to mind. This finding has also been reported in a study conducted by Morine and Vallance (1975).

Characteristics of Teacher Decision Processes

The purpose of this section is to review the literature and research that deal with characteristics and concomitants of teacher decision processes. The topics that have arisen through this review include:

1. Types of Interactive Decisions
2. The Incidence of Decision Alternatives
3. The Teacher as Information Processor.
4. Decision Making and Heuristics

One striking result of this review is that there is a definite lack of information in these areas. This is especially obvious in the field of educational administration. Research conducted by those involved in educational administration appears to have avoided teachers' decision making in the classroom. Indeed, until very recently, teachers' classroom behaviours have tended not to be of significant concern to this discipline. However, this is changing. Recent studies have emerged from educational administrators that do focus upon teachers' behaviours in the classroom and on the effect that those behaviours have upon students (see King, 1979; Smyth, 1979; Mireau, 1980; Juckwell, 1980). The importance of administrative knowledge of teachers' classroom decision making, therefore, is being recognized. These and other studies have shed light on the impact of teacher behaviour upon student learning. Thus, there is an imperative for educational administrators to be cognizant of the behaviours that teachers exhibit in their classrooms.

Types of Interactive Decisions

Jackson (1968) coined the term 'interactive decision' to refer to decisions made during the interactive phase of teaching--that period of time during the teaching day when the teacher interacts with students. He further distinguished pre-active decisions--those that deal with curricular and instructional planning before the act of instruction--and post-active decisions--those made during the reflective phase of teaching that follows the act of instruction. Pre-active, interactive, and post-active decisions are terms that have been accepted by many educational researchers (Brown and Farr, 1971; Mosston, 1972; Whitfield, 1974b; Russo, 1978; Shavelson, 1979).

The literature appears to identify three major foci of teachers' interactive decisions. These are:

1. Implementation of pre-planned lesson tactics and the changing of these tactics during the instructional interaction between teacher and student.
2. Implementation of strategies following the perception of behavioural deviations observed during pupil-pupil and pupil-teacher interactions.
3. Implementation of strategies that deal with the organization of equipment and with the handling of situational constraints.

Smith and Geoffrey (1968), in their classic study of the elementary classroom, discussed teacher interactive decision processes in terms of the relationships between the degree of students' deficiencies in knowledge and skill growth and the instructional process used by the teacher. Teachers' decisions, Smith and Geoffrey claim (1968:238), centre upon the content of knowledge presented or the level of skill to be practiced and the particular methods or tactics employed. Labelling these as pacing decisions, Smith and Geoffrey explained them as being based upon a time ratio; the components of this ratio being, on the one hand, the time available to complete a given activity, and, on the other, the amount of observed and perceived student learning.

Brown and Farr's (1971) study of teacher decision making as a cognitive process is concerned with the degree to which lesson objectives are attained and with determining mastery of long-range objectives. Following their observations that teachers often persist with teaching behaviours regardless of their appropriateness to the situation, Brown and Farr (1971:341) introduced the term forfeit or null decision, meaning decisions to take no action.

In a study involving student teachers, Whitfield (1974b) determined that there are six classes of interactive decisions. His typology includes:

1. Learning-Cognition: This class consists of decisions that relate to the implementation and/or modification of preactive decisions, language structure, number and type of example used in a lesson, and approaches to students' errors and their corrections.
2. Learning-Attitude: Whitfield (1974b) explains these decisions in terms of teachers providing incentives that, it is hoped, motivate student behaviours.
3. Relationships:Pupil-Pupil: Decisions dealing with discipline and social control of student-student

interactions.

4. Relationships: Pupil-Adult: Decisions dealing with discipline and social control of student-teacher and student-adult interactions.
5. Environmental: Equipment: Decisions regarding physical and situational constraints.
6. Environmental: Organization and Administration: Decisions regarding lesson pacing and school or classroom rules and regulations.

In their study of the nature of teachers' decision processes, Winne and Marx (1975) reported five categories of interactive decisions. They included:

1. Objectives-oriented decisions.
2. Low-order content decisions.
3. Instructional process decisions.
4. Learner-centred decisions.

These categories, though, are very broad and deal exclusively with instructionally-oriented situations.

Clark and Peterson (1976), in their laboratory study of teachers' interactive decision making, found that their subjects' decisions were grouped around (a) organizational or administrative objectives and (b) cognitive and affective outcomes. However, it must be stressed that this study was conducted in a laboratory setting rather than in a natural setting. The subject teachers were not dealing with children of whom they had previous knowledge; rather they were dealing with strangers in strange surroundings.

The Incidence of Decision Alternatives

There appears to be widespread agreement among investigators that teachers seldom consider more than one or two alternatives in the formulation of interactive decisions.

Whitfield (1974b) claims that teachers do not usually generate all decision options available to them. He postulates that this finding is due to teachers' insensitivity to the options that might be chosen, a certain degree of rigidity in thinking, a lack of creativity, or well developed value systems that act as screens for decision options. Whitfield (1974b:87-88) further suggests that an experience base is required to deal fluently with the many and diverse variables that arise in the classroom.

Hargreaves (1979:74) supports Whitfield's findings:

> (M)ost . . . decisions (formulated by teachers) have not always been routine . . . but have become so through experience. For the student or inexperienced teacher they are a frequent source of deliberation and puzzlement. . . . and often lead to a cumulative anxiety, since the immediacy and constantly shifting nature of classroom events demand that most classroom decisions be made 'on the spot'. . .

Whitfield's findings have been replicated by Clark and Peterson (1976), who found that their study teachers seldom considered alternative strategies while teaching. Indeed, these investigators report that alternative strategies were considered only when a lesson was judged to be progressing poorly.

In similar fashion, Marland's (1977) investigation into classroom teachers' thought processes found that teachers make fewer than ten overt decisions per lesson. During the formulation of these decisions, Marland (1977:193) claims, the study teachers usually considered but one or two alternatives.

Finally, the findings of Shavelson and company (1977), Cone (1978), and Shavelson and his colleagues (1978), indicate that there is a limited rationality in teacher interactive decision making. Although teachers in these last studies seem to have generated decision alternatives almost spontaneously, they rarely considered the desirability of these alternatives in light of others.

The Teacher As Information Processor

Implicit within the concept of the teacher as decision maker is the assumption that the teacher is a key agent who receives information and, as a result, formulates opinions, estimations and judgements used in decisions (Elstein and Shulman, 1975; Shavelson, Cadwell and Izu, 1977). Elstein and Shulman (1975:35) state that the teacher's role is that of " an active clinical information processor involved in planning, anticipating, judging, diagnosing, prescribing, problem solving." In other words, the teacher's perceptions of students' behaviours are used in developing lesson tactic decisions, implementing these decisions, and developing further instructional decisions based upon the classroom activities observed during the implementation of those decisions.

Winne and Marx (1977:669) state this concept succinctly:

> (I)t seems reasonable to characterize teachers as dynamic decision makers who choose to vary their teaching during instruction on the basis of immediate and prior information about students.

The interpretation process implicit in the views of both Elstein and Shulman and Winne and Marx emphasises the importance of examining teacher perceptions and the role that these perceptions play in determining what actually occurs in the classroom. As Crocker (1977:8) explains, "the focus on perceptions presents the image of the teacher as an interpreter of events and a decision maker who acts on these interpretations."

This view of the teacher as decision maker, further, suggests that the teacher's system of beliefs and values is a crucial factor in the determination of the way in which decision data, information, or behavioural cues are perceived and subsequently interpreted (Smith and Geoffrey, 1968; Sarason, 1972; Brophy and Good, 1974; Phares, 1976; Radford, 1977). Smith and Geoffrey (1968:88-90), for example, view the teacher as a decision maker who involves "subjective probability" and "subjective rationality" processes through his prediction system (which is based on perceived consequences) and his value system (which is based upon his conception of the ideal). Support is found in Hargreaves (1979:79), who claims that a teacher's decision making skills are "embedded (in) and affected by the teacher's values", including his ideology, pedagogical preferences, and his social values. Hargreaves states that "decisions are made partly on the basis of social skills and partly on the basis of certain value commitments: both are encapsulated and rapidly processed in every routine classroom decision."

There are also contextual factors that facilitate or inhibit the perception of classroom-based information. Fishbein and Ajzen (1975: 463) report that these factors are to be found in the characteristics of (a) the communicator, (b) the receiver, (c) the piece of information itself, and (d) the situation in which the information is transmitted. Fishbein and Ajzen contend, first of all, that certain communicator characteristics, such as perceived credibility, expertise, and trustworthiness, will influence the receiver's confidence in the source of the information. In the context of the classroom, then, a teacher who perceives a student as lacking credibility, expertise, or trustworthiness will tend to interpret cues from that student in a negative light. On the other hand, a student who is perceived as credible, knowledgable and trustworthy will tend to be viewed by the teacher in a more positive manner. This source belief, Fishbein and Ajzen claim directly affects the way in which behavioural cues will be perceived.

In the second place, Fishbein and Ajzen suggest that the characteristics of the receiver of the information are equally important. They claim that such characteristics as general persuasibility, degree of anxiety and level of self esteem serve to influence an individual's degree of confidence in his own behaviours and, hence, in the validity of the information he receives. Finally, according to Fishbein and Ajzen (1975:463-464), characteristics of the situation and the way in which the information is transmitted are two additional determinants of the way in which a piece of information, such as a behavioural cue, may be interpreted. Such factors include the anxiety level of the situation, the degree of perceiver involvement in the situation, the degree of situational uncertainty, and the degree of rationality or emotionality of the message transmission.

Research On Teacher Information Processing. In their discussion of cues used by teachers in formulating interactive decisions, Clark and Peterson (1976:9) developed a three-dimensional categorization of decision data perceived by teachers. These are high inference student behavioural cues, intellectual characteristics, and specific low inference overt behaviours. The researchers claim that it was rare for their subjects to mention low-inference behaviours as decision cues; rather, judgements made of students' behaviours were often based upon the degree of student participation in the lesson. Furthermore, Clark and Peterson initially reported that their teachers tended not to change their plans or behaviours in response to observed student reactions. Upon further investigation, however, they concluded that teachers continued or elaborated the instructional activity in which they were engaged whenever their students reacted favourably to that activity but when met with unfavourable student reactions tended to deviate from their original plans or shift to an entirely new activity without checking to determine the cause for student reactions. In keeping with these findings, Clark and Peterson concluded that:

1. Teachers tend not to optimize instruction with their

decision making.

2. Teachers rarely tend to change lesson tactics even when they viewed instruction as progressing poorly.
3. Student participation and involvement in the lesson are the primary cues used by teachers in the formulation of estimates of the progress of instructional strategies.

In an earlier study, Marx and Peterson (1975:13) discovered that a negative correlation exists between teachers' subject matter orientation and teachers' orientation to learners; that is to say the more oriented the teacher is to the subject matter, the less oriented he is to the student.

Shavelson and Atwood (1977) studied the way in which teachers formed estimates of their students' states of mind and learning. These investigators (1977:133-134) advance a model of estimate formulation that contains two major components: student performance behaviours and teacher hypotheses or "hunches" of students' states of mind, as inferred from students' performance behaviours. Their findings lead Shavelson and Atwood to suggest that teachers form interactive decisions intuitively rather than rationally. Shavelson and his colleagues (1978), furthermore, suggest that although teachers make optimal use of all available cues and information in the formulation of estimates about student aptitudes, they seldom use these estimates in the formulation of interactive decisions. Rather, teachers prefer to base their estimates on teaching beliefs, principles, and observed behaviours.

In discussing interactive decisions focussing upon classroom management, Shavelson and company (1978) state that such managerial decisions are responses to perceptions of deviant behaviours. Information for these decisions is gleaned from the teacher's knowledge of the previous history of the student exhibiting the behaviours, the teacher's estimates of the probability of disruptive behaviour occurring, and the teacher's perceptions of the current behaviour.

The findings of Cone's 1978 study appear to deviate slightly from those of Shavelson and his fellows (1978). Cone studied teachers' managerial decisions in a laboratory setting and found that teachers' beliefs appeared to have no significant effects upon the formulation of managerial decisions. Neither did teachers' beliefs associate with any perceptual nor with any behavioural cues. Cone did find, though, that the order in which these cues were received had significant effects upon the teachers' estimates of the probability of the occurrance of disruptive behaviours and on his decision formulation. Cone reports that teachers in his study expected more deviant behaviour in large group settings than in smaller groups. He also found that teachers' expectations about student disruptive behaviours were related to their styles of classroom organization, types of deviances, and histories of students' behaviours. In addition, Cone supports the contention of Shavelson and his colleagues that teachers' interactive decisions are not entirely rational. He cites Brophy (personal communication), who claims that teachers' class management behaviours are a result of "pure habit acquired through conditioning with minimal awareness." Cone concludes that for each of his subjects the time available to respond to specific situations did not allow the teachers to consider all the effects of the relevant cues to their managerial decisions.

In her study of teachers' decision policies, Russo (1978) found that teachers use students' behavioural and achievement cues more than educational beliefs in estimating student learning states. This supports Cone's (1978) findings. Russo's study was also conducted in a laboratory setting.

Although Russo (1978) dealt specifically with preactive decisions, her findings have relevance for studying interactive decisions. Russo (1978) reports that the nature of the student group is a crucial factor in determining the instructional approach used by the teacher, the selection of instructional materials, lesson pacing, the degree of lesson individualization, and judgements about the importance of teaching and learning objectives.

The studies conducted by Shavelson and company (1978) and Cone (1978), it should be pointed out, were conducted in laboratory settings rather than classrooms and the findings of these studies may not be replicable in natural settings; this points to the need to study teachers' interactive decision formulation in the classrooms.

In discussing teachers' interpretations of decision cues, MacKay and Marland (1978:13) suggest that teachers do make inferences about students' emotions, the degree of student motivation, and student performance behaviours. They develop this theme further and claim that these inferences are based upon "gross and clearly observable student behavior . . . without attending much to the subtle, less overt cues . . . . such as facial expressions, gestures, and verbal emphases."

Decision Making and Heuristics

The previous discussion on teacher information processing drew attention to the uncertain nature of various types of decision information. This is especially true in regard to the perception of verbal and non-verbal behavioural cues (Kahneman and Tversky, 1972; Slovic, et al., 1977). However, teachers are often required to make judgements, predictions, and decisions on the basis of such ambiguous cues (Kahneman and Tversky, 1972, 1974; Elstein and Shulman, 1975; Slovic, et al., 1977) and this points to their critical role in the formulation of estimates of their students and their lesson strategies.

Although little is known about the process through which teachers form estimates, recent research has discovered some very interesting and important aspects of the relationship between the use of heuristic techniques and estimate formulation. Much of this thrust into heuristic research has been initiated by Kahneman and Tversky (1972, 1974).

Kahneman and Tversky, in their two studies, examined the process of human judgement or estimation and postulated the existance of two distinct types of heuristic techniques that are commonly applied to estimate formulation: representativeness and availability. The investigators (1972:431) found that an individual's assessment of a behaviour or event tends to be determined by the degree to which the behaviour is similar in basic features to a "parent population" of behaviours. For example, the observation of a student looking out a classroom window during a lesson may lead to a teacher forming the judgement that the student is not listening or paying attention. An investigation of the student's behaviour may reveal that he is indeed not listening; however, the formulation of an estimate or judgement of the intent of the student's behaviour based solely upon observation involved the use of the representative heuristic. In other words, the teacher assumed that the student was not listening or paying attention, because the teacher has found that looking out the window during a lesson is frequently associated with innatention; the student's behaviour was representative of behaviour that may be labelled "inattentive". According to Winne and Marx (1977:672), the use of representative heuristics is in effect a classifying or "pigeon-holing" process. Availability heuristic, also a cognitive mechanism, has been defined by Kahneman and Tversky (1974:230) as a process by which the individual judges or estimates the practicality or effectiveness of a particular action or strategy. For example, a teacher who judges that a particular teaching strategy is effective by observing the degree of student involvement or enthusiasm, is using an availability heuristic, in that he is using available information rather than a well designed evaluative process to judge strategy effectiveness. The authors claim that the use of this mechanism usually results in an exaggeration of the effectiveness of application, either positively or negatively.

On this point, furthermore, Slovic and company (1974:4) suggest that " people systematically violate the principles of rational decision making when judging probabilities, making predictions or otherwise attempting to cope with probabilistic tasks." They contend that individuals tend to be insensitive to considerations of data reliability. These findings imply that (a) classroom teachers' estimates and judgements concerning student behaviours and learning states are not accurate, because they are based upon data that has emanated from unreliable sources, namely observation of student behaviours and performance, and (b) that once these estimates have been formed, there is much difficulty in changing them, even though new data may contradict the estimate producing data. This phenomenon, termed anchoring, has been documented extensively in the literature (Kahneman and Tversky, 1972:431-432; Elstein and Shulman, 1975:21; Winne and Marx, 1977:672). Hence, as Winne and Marx (1977:672) note, the use of heuristic mechanisms "sometimes lead to severe and systematic errors in the decisions rendered", leading to stereotypic teacher decision behaviours. Estimating meaning of student behaviour through observation alone may result in classifying the student as (a) bored, (b) disinterested, (c) confused, or (d) 'lazy'. Similarly, estimating the effectiveness of a lesson strategy through observations of the degree of student involvement or noticeable enthusiasm does not approach an evaluation of the degree of student learning that has occurred as a result of the implementation of the strategy.

Shavelson and his colleagues (1977) however, disagree with the conclusions drawn from studies by Kahneman and Tversky and Slovic, et al. that teachers, when faced with uncertain data, tend to reduce that data through heuristic processes. In their study of the degree of teachers' sensitivity to information reliability the investigators observed that their subjects were indeed responsive to the reliability of the information they received and that they tended to avoid the dangers of heuristic processes. Indeed, the findings of the study conducted by Shavelson and company do contain indications that teachers do revise their initial probability estimates of students' states of learning as new information is received.

There appears to be support for this view in the findings of Yoshida and Meyers (1975). These researchers examined the effects of labelling students as educable mentally retarded upon teachers' expectations for change in students' behaviours. Yoshida and Meyers (1975:523) question the theory associated with labelling. They suggest that studies conducted by such investigators as Beez (1970) and Rubovitz and Maehr (1971) were of short duration and, hence, did not permit sufficient time for the development of biases other than those generated through heuristic techniques. On the other hand, they point out, findings of studies by Dusek and O'Connell (1973) and O'Connell, Dusek and Wheeler (1974) indicate that teachers' estimates of students' achievement behaviours are related more to the teacher's personal ranking of those students than to their labelling.

The results of these studies tend not to support the labelling or stereotyping perspective; that is to say, the data suggest that teachers do test the veracity of information they receive about their students. Indeed, the results of Yoshida and Meyer's (1975:525) own three week study suggest that "expectancies may be based upon personal observation by a teacher rather than a label given to a student."

Methodology

Recent research on teaching has stressed the need to examine various elements of teaching (Mosston, 1972; Clark and Joyce, 1975; Crocker, 1978; Cooper, 1979). As well, several researchers have called for a specific focus on the processes involved in the formulation of teachers' interactive decisions (Marland, 1977; Conners, 1978a; Cooper, 1979; Sutcliffe and Whitfield, 1979).

In examining teacher interactive decision making a naturalistic approach employing both exploratory and introspective techniques is judged to be a more appropriate approach than other more 'conventional' methods of inquiry, such as laboratory situated experimentation, since, as Guba (1978:11, 15) suggests, they are based on vastly different philosophical perspectives. The researcher employing 'conventional' experimentation techniques "seeks the facts or causes of social phenomena with little regard for the subjective states of individuals." On the other hand, the researcher employing naturalistic methodologies, such as exploratory and introspective techniques, "is concerned with understanding human behavior from the actor's own frame of reference" and that the reality that is observed "exists only in the minds of individual people and depends heavily on their separate perceptions."

Until very recently, though, few studies have investigated teachers' interactive decisions with both an introspective methodology and a natural setting. Fortunately a research tradition has been developing, mainly through anthropological and sociological investigations, which is suited to exploratory investigation, is based on instrospection, and is immensely applicable to educational research (Wilson, 1977).

Exploratory Research

Two synonyms for research that has been labelled exploratory are naturalistic and ethnographic (Tikunoff and Ward, 1978). This type of research involves the systematic observation of phenomena in a natural setting and is designed primarily to develop hypotheses for further study (Kounin, 1977; Wilson, 1977); it is open-ended, subjective discovery that results from the accumulation of data which represent the history of a phenomenon's occurrance. Typically, the data are recorded in a narrative, descriptive form. Thus Sanday (in Erickson, 1979:182) defines this branch of research as "a way of systematically learning reality from the point of view of the participant", while Garfinkel (1967:11) asserts that ethnographic studies are investigations of the elements of human behaviours as ongoing events in the natural world. Furthermore, the focus of such inquiry, according to Tikunoff and Ward (1977:4), is on the way in which organisms interact with other organisms and with their environments.

Miller (1977:211), in discussing the roles of naturalistic research in comparative psychology, claims that such qualitative explorations might be used to:

1. Study nature for its own sake.
2. Use nature as an initial starting point from which to develop a subsequent program of research.
3. Use nature to validate or add substance to previously obtained laboratory findings.
4. Obtain from nature information pertaining to species variables that will subsequently increase the efficient utilizations of subjects in the laboratory setting.
5. Use the field as a naturalistic "laboratory" to test hypotheses or theoretical concepts.

MacCannell (1975:5) categorizes exploratory research as ethnomethodology in that its phenomenological perspective takes " consciousness itself as its object, or attempts to describe the essence of perception, intuition, ideas, imagination." Further, the behaviour of others is studied to approach "meaning-in-use" in a "natural, unproblematic way" to determine "(a) future affairs and expectations, . . .(b) previous conditions, and . . . (c) other behaviors in the present situation (MacCannell, 1975:9)."

The Strength of the Ethnomethodological Approach

Goffman (1961) was one of the first of many social scientists to recognize the value of the ethnographic paradigm in helping students of human behaviour understand their subjects. In the preface to his series of essays on the behaviours of mental patients, Goffman (1961: ix-x) insists that:

> any group of persons . . . develop(s) a life of (its) own that becomes meaningful, reasonable, and normal once you get close to it . . .

Barker (1969:35), in developing a position for an ethnographic thrust in behavioral science, claims that:

> When we look at the environment of behavior as a phenomenon worthy of investigation for itself, and not merely as an instrument for unravelling the behavior-relevant programming within persons, we find that it is not a passive probabilistic arena of objects and events.

Wilson (1977:247) perceives ethnographic research techniques as being invaluable in generating theory about social phenomena. As people's behaviours are significantly influenced by the environments in which they function, it is imperative that the researcher study behaviours and phenomena in their natural settings.

Gump's (1969:200) support of the importance of naturalistic investigations is no less emphatic:

> (T)o develop a description and taxonomy of the parts . . . we must look at them in the place they occur. . .

Gutman (1969:162) exhorts researchers to enter the natural environment, since intrinsic controls within these settings "will organize and drive events even though our theories take no notice of them."

Cusick (1973:4), from the perspective of the educational anthropologist, believes that "if one is to gain a reasonable understanding of a social environment, he should study it from the viewpoints of the groups who create it." Stake (1978:5) agrees with these proponents of ethnographic research in understanding human behaviour, in that the use of these methodologies might actually be a preferred mode of investigation, as compared to the variables-oriented experimentation within the tradition of Campbell and Stanley (1963).

Views such as those outlined above are applicable to educational research in general and especially to an examination of the behaviours that occur within the classroom (Gump, 1969; Shavelson and Atwood, 1977; Conners, 1978a; Erickson, 1979). Gump (1969:204) records his support for ethnographic research on classroom behaviours, on the grounds that it is only through the application of this approach that educational researchers are able to obtain more complete understandings of the events that occur within these environments.

The ethnographic mode of research has also been supported in recent educational investigations. Shavelson and Atwood (1977) insist that the most appropriate method of obtaining data of teachers' behaviours is to observe teachers behaving in a variety of teaching situations. Conners (1978a:306) suggests that there is a further need to "penetrate below 'surface' level behaviours and find out why teachers are behaving in certain ways . . ."

Kounin (1977) views naturalistic research as stressing completeness, rather than objectivity. Completeness implies the total data of an individual's behaviour, not only the type of behaviour exhibited but also the manner and sequence of that behaviour. This, then, is the task of naturalistic or ethnographic research: to collect, describe and explain data.

The foregoing demonstrates the need to employ exploratory and introspective methodologies in an investigation of teacher decisions. If the intent of the investigation is to develop an understanding of the processes involved in decision making in the classroom, then it must involve such ethnomethodologies. As Wilson (1977:249) asserts:

> the social scientist cannot understand human behavior without understanding the framework within which the subjects interpret their thoughts, feelings, and actions . . .

Further, Wilson claims that by employing an experimental approach that stresses objectivity, the researcher is forced to:

> impose a priori limitations on the data, an act which makes it difficult to discover the perspectives of the subjects.

Observation and Interview

Researchers conducting ethnographic investigations must rely upon observations of their subjects' behaviours as a primary source of data (Greer, 1964; Becker and Greer, 1967; Harre and Secord, 1972; Tikunoff, Ward and Behnke, 1979). It is imperative that inquiries into human behaviour respect the principles that (a) the behaviour must be accepted as it is exhibited and (b) the behaviour must be recorded without interpretation by the recorder.

Observations of subjects in their natural settings, termed field observation (Tikunoff, Ward and Behnke, 1979), are of two types: (a) participant observation (Becker and Greer, 1967) and (b) non-participant observation or objective observation (Blumer, 1966). Becker and Greer (1967) have defined participant observation as the active involvement of the observer in the daily life of the subjects. Such involvement by the investigator may be conducted openly with the explicit understanding and acceptance of the subjects or covertly, in disguise. Non-participant observation, on the other hand, allows the investigator to observe behaviours in a passive manner rather than in an active way; that is to say, he takes no active part in the daily life of the subjects, he only records the events and behaviours he witnesses. The decision as to which tack to employ depends upon many factors, including the age of the subjects and the observer, the purpose of the study and, of course, the degree of volatility of the environment (Goffman, 1961; Cusick, 1973).

As an actor as well as an investigator, the participant observer is more than an objective reporter. As a participant in the interaction of behaviours and environmental influences, he is able not only to obtain data by observing the behaviours of others but also to add richness to objectivity by providing his perceptions and insights as a subject of the study. Such richness may be observed in studies conducted by Smith and Geoffrey (1968) and Cusick (1973).

In contrast, the non-participative or objective observer must record only what he sees or hears without interpretation or explanation. For the objective observer to do otherwise is to run the risk of contaminating the study by "substituting his view of the field of action for the view held by the actor (Blumer, 1966)." Obviously, the actor or subject views his behaviour and the behaviours of others through his own pattern or system of belief constructs that greatly influence his perception (Sarason, 1972; Radford, 1977; Hargreaves, 1979). Richness is added to objective observation through the use of the interview. Either structured or unstructured, the interview has the potential of going beyond non-interpretive observation of the subject's behaviour to rich explanations by the subject of his own behaviour.

One important principle must be stressed at this time. If the investigator accepts the interview as a valid data source, then he must also accept that human commentaries are "authentic, though revisable reports of phenomena, subject to empirical criticism (Harre and Secord, 1972: 101)." Harre and Secord (1972:112), in their discussion of a subject's awareness of his behaviour, claimed that:

> A person can be said to be aware of what he is doing if, but not only if, he is capable of telling what he is doing, either before he begins or at any time during the performance or fairly soon afterwards.

Problems in the Use of Ethnomethodologies. Erickson (1979b:183), in a discussion of problems that are associated with the use of ethnography, has listed four major concerns with which the researcher must deal. These include problems in (a) timing and sequencing, (b) validity, (c) superficiality, and (d) evidentiary adequacy.

The process of actually conducting an ethnography or a piece of naturalistic research and the subsequent writing involves a great deal of time. As such, it is impossible to generate findings and conclusions within the "short-term", that period of time immediately following the implementation of the investigation. These "short-term" benefits may then be lost.

The validity question deals primarily with (a) the intensity of the study, (b) the competence of the field researcher, and (c) the reliability of the respondents. There is always the problem that the study has not been conducted with sufficient intensity to provide data that will answer the posed questions. Secondly, the issue of researcher competence with the techniques of ethnographic research must be raised. Such methodology necessitates both cognitive and affective skills that other methods may not. A third concern of validity centers on the reliability of the responses obtained from the subject. Questions, such as "Has the subject been honest in his responses?" and "Is the subject aware of his behaviours or of the rationale for them?", must be dealt with realistically, no matter how painful the answers may be.

Superficiality is another area of serious concern for the ethnographic researcher. Often the layman is not aware of the data reduction that is entailed in reporting naturalistic research and, hence, may regard the findings of such research as being superficial and without significant meaning to him. Further, when inferential statements are made without sufficient supporting data, the question of "evidentiary adequacy" arises (Erickson, 1979:184). However, judging the amount of data that does constitute sufficiency is a skill that all researchers must develop, not just ethnographers. The credibility of research findings and subsequent conclusions depends, to a large extent, upon the adequacy of the supporting data.

All these problems can be overcome by (a) adequate planning, (b) sufficient training, (c) good luck, (d) conducting short-term studies instead of prolonged investigations, and (e) "ethnographic monitoring" (Hymes, 1976, in Erickson, 1979:183) which is the continuous checking of the study by the researcher, the subject, an associate, or all of these, to determine the validities of the various elements of the study (Erickson, 1979:183).

Stimulated Recall Interviews Using Videotaping

A recent innovation in educational research is the use of the stimulated recall interview, using videotaped records of the behaviours of teachers and students (Marland, 1977; Conners, 1978a; King, 1979; Mireau, 1980). Stimulated recall is defined as a method of recalling a subject's thoughts, feelings, or recollections about a particular event or behaviour by stimulating the subject with the use of audio and/or visual representation of that event or behaviour (Bloom, 1954; Marland, 1977; Elstein, Shulman and Sprafka, 1978). Stimulated recall has been used to investigate the behaviours of teachers (Marland, 1977; Conners, 1978a; Tuckwell, 1979), of students (Bloom, 1954; Nolan, 1978; King, 1979), and medical practitioners (Elstein and Shulman, 1971; Elstein, Shulman and Sprafka, 1978).

The technique of videotaping behaviours to obtain data for stimulated recall interviews is a recent but well-documented development (Mintzberg, 1973; Marx and Peterson, 1975; Clark and Yinger, 1977). Minzberg (1973:228) notes that the value of videotaping as a means of collecting data is great, since the camera "picks up nuances missed by the observer and unnoticed by the respondent."

Dunkin and Biddle (1974:57) observed that the use of videotaping as a data collecting technique has grown in popularity. They claimed that this procedure of capturing behaviours on videotape produces "stabilized records of the teaching process that can be studied at leisure." Kounin (1977) chose this method of data collection for his study of the ecological dimensions of school settings, since it ensured him a relative completeness of the data collected, as compared to other methods, such as the critical incidents technique. Much of its use, though, has been in laboratory settings. Stimulated recall has been used sparingly in naturalistic settings (Marland, 1977; Conners, 1978a; King, 1979). Within the broad scope of exploratory research in natural settings, the use of stimulated recall in studies of teachers' interactive behaviours is gaining support (Clark and Peterson, 1976; Marland, 1977; Conners, 1978a; King, 1979; Mireau, 1980).

Elstein, Shulman and Sprafka (1978) employed videotaping and stimulated recall techniques in their study of medical problem solving. They saw this approach as a means of moving beyond just observable behaviour towards the "thoughts, feelings, associations and strategies . . ." of the individual during the time the behaviours occurred (Elstein, Shulman and Sprafka, 1978:50). Conners (1978a:75), in his study of teachers' thought processes during instruction, used stimulated recall because it was viewed as being "less intrusive than other introspective means, such as 'think aloud techniques'."

Problems with the Use of Stimulated Recall Interviews Using Videotaping. However, as a relatively new technique in introspective research, stimulated recall with videotaping does present potential difficulties. Barker (1969:15) warned that, as with other methodologies, the need to focus on a limited range of a subject's experiences might prevent the researcher from gaining an understanding of the complete picture. Focussing upon the teacher's decision behaviours, for example, might result in the researcher being "even further from the ecological environment he sought." (Barker, 1969:15)

Clark's (1978) concept of the "synoptic view" of the instructional situation is in agreement with Barker's. The synoptic view stresses the importance of "a clear picture of all the major elements involved, their inter-relationships, relative importance, and interconnections with things and events that precede, follow, or otherwise effect the planned activity." Without a complete picture of the classroom and instructional situation, there is, in Clark's view, a great risk that "the teacher is relegated to the role of mere executor of, for example, a teacher's guide for a curriculum."

Oberg (1975:96), in her study of teacher's curriculum planning decisions, observed difficulties with introspection as a means of data collection. First, there is the possibility that teachers might have forgotten some of the thoughts or processes used during the events. Second, there was potential discrepancy between the teacher's "logic-in-use" and "reconstructed logic" (Oberg, 1975); that is the logic in reality generated in post-implementation interviews.

As a result of their use of stimulated recall, Elstein, Shulman and Sprafka raised two cogent questions:

> 1. (T)o what degree was the subject's retrospective account of what he was thinking at time 'T' distorted or confounded by his knowledge of the data subsequently available, his interpretation of these data and, indeed, his final resolution of the problem?
> 2. If retrospective distortion occurred, could it be consistently identified and controlled, or at least discounted?

Unfortunately, the authors did not provide definitive answers to these questions. Similar cautions were raised by Marland (1977:40).

Metz (1978:8) claims that researchers using introspective interview techniques tend to assume that the subject is explicitly aware of his beliefs in the area being researched. Further, Metz notes that such researchers often assume that the subject is willing to communicate the beliefs that he holds. Metz argues that both these assumptions are not valid in light of available research, for there is evidence to suggest that teachers tend to recall aspects of classroom behaviours inaccurately. This finding has been seen also in studies conducted by Brophy and Good (1974) and Keller and Martin (1974). Furthermore, as Rokeach (1970:2) stated:

> (W)hen a person says, "This I believe . . .", he may or may not be representing accurately what he believes because there are often compelling personal and social reasons, conscious and unconscious, why he will not or cannot tell us.

Nevertheless, provided the researcher is aware of and guards against these potential threats, the use of videotaping and stimulated recall is viewed as being a viable and indeed a very useful research tool in educational research. If the interview is to be accepted as a valid source of introspective data, then the premise that human commentaries are authentic accounts of behaviour must also be accepted as being valid. This premise has gained considerable support over the past few years (Gaier, 1954; Smith and Geoffrey, 1968; Harre and Secord, 1972; Bussis, Chittenden and Amarel, 1976; Wilson, 1977; Clark and Yinger, 1979; Erickson, 1979b).

There are obvious limitations to the stimulated recall interview as a tool of introspective research and many of these have been enumerated. At this point in the evolution of inquiry into teachers' interactive decision processes, though, extensive use must be made of direct lines of investigation. There must be an assumption that a relationship exists between the accuracy of an individual's recall and his overt recall (Gaier, 1954:148). There must also be a trust that the individual has the capacity to be aware of his behaviour, as Harre and Secord (1972:112) claimed.

Only with the rich descriptions and explanations supplied by the teacher through the use of indepth interviews can we hope to approach an understanding of the "why" of decision behaviour. The question of the validity or credibility of introspective research, raised earlier (Oberg, 1975; Elstein, et. al., 1978; Metz, 1978), may be overcome, in part, through the use of Hyme's (in Erickson, 1976:183) process of "ethnographic monitoring", or the continuous checking of the appropriateness of the methodology and its impact by either the researcher, the subject, an associate or any combination of these. This procedure will aid in determining the validity of the various elements of the study. Issues of reliability are dealt with later in this study.

Summary

The Teacher Decision Process

Thinking about teacher decision making may be seen as existing in two contexts: the pre-1968 objective, rational phase and the post-1968 subjective, introspective phase. The pre-1968 thinking conceptualized teaching as a series of consciously directed decision moments. Synthesis of the thoughts of McDonald (1965), Strasser (1967), and Marcus and Wilson (1973) produces a model of the teaching act that may be seen to be a rational decision process.

This traditional thinking about teacher decision making in the classroom, though has been criticized. The literature suggests that decisions are neither distinct nor necessarily linearly related (Newell, et al., 1958; Merrifield, et al., 1962). Some studies cast doubt upon the conscious alternatives-generating phase of teacher decision making. Other research supports the claim that time constraints preclude a rational form of decision making; hence some authorities have postulated that the immediacy of classroom interactions and the necessity for rapid adjustments resulting from these interactions reduce interactive decision making to an almost intuitive process.

Decision Characteristics

Recent research suggests five types of interactive decisions:

1. Decisions concerning the implementation of pre-planned lesson tactics.
2. Decisions concerning students' behaviours and behaviour deviations from teacher expectations.
3. Decisions concerning ways of dealing with environmental or situational constraints.
4. Decisions concerning the progress of implemented lesson tactics.
5. Decisions concerning the adequacy of student learning.

These, in turn, may be grouped into three general categories:

1. Decisions focussing upon the implementation of lesson tactics and the changing of those tactics during student-teacher interactions.
2. Decisions focussing upon behavioural deviations from the teacher's expectations, as observed in pupil-pupil and pupil-adult interactions.
3. Decisions focussing upon organizational concerns dealing with equipment or situational constraints.

The Teacher as Information Processor. The factors that tend to influence the quality of the perception of information received by the teacher may be summarized into the categories outlined below:

1. Process Variables
2. Perceived Communicator Characteristics
3. Perceived Receiver Characteristics
4. Perceived Situational Characteristics
5. Perceived Method of Information Transmission

These factors impinge upon the perception of decision data and have a marked influence upon the quality of interactive decisions formulated by the teacher.

Findings of research conducted in laboratory settings suggest that:

1. Teachers tend not to use estimates of students' states of mind and learning in the formulation of interactive decisions; teachers seem to rely on observations of and the resultant inferences from students' behaviours.
2. Teachers' interactive decisions are formulated using the most easily available information.
3. Teachers' beliefs about effective teaching have little effect upon the formulation of interactive managerial decisions.
4. Teacher formulation of interactive decisions appears to

be more an intuitive process than a rational process.

In light of these findings, many questions exist about the information that teachers receive and use during the formulation of their interactive decisions. Accordingly, there appears to be a need to examine further the phenomena of information processing and the use of estimates in the decision process.

Heuristics in Interactive Decisions. It appears from the discussion concerning heuristics that there is litle consensus on teachers' use of heuristic techniques in the estimation or prediction of student behaviour or learning states. On the one hand, some investigators hold the view that the forming of estimates based upon indiscrete, imprecise or uncertain information is accomplished through the use of heuristic techniques. On the other hand, other investigators claim that teachers' estimate formulation is based upon direct observation rather than stereotypes.

Two questions arise from this. If the individual is exposed to the behaviours or events for a sufficient length of time, will he cease to rely upon heuristics as a means of formulating estimates and judgements? And, second, do teachers, by virtue of their extended contact with students, avoid the use of heuristics in the formulation of estimates and judgements of their students' states of mind, behaviour and other characteristics and rely more upon direct observation?

Methodology

The use and support of exploratory, ethnographic research has been well documented in the literature. This approach to investigations of phenomena has been advanced as highly appropriate when it is the intent of the researcher to explore and describe what does occur in the natural environment.

Two methodological techniques have been discussed in this review: observation and interviewing. Observations of events and behaviours are of two types, (a) participant observation, and (b) non-participant observation. Participant observation places the investigator in the field of research as an actor and allows him to gather data concerning not only the behaviours of his subjects but also data concerning his own perceptions and feelings as a participant. Non-participant observation, on the other hand, does not allow the investigator the priviledge of becoming involved in the daily life of the subjects but merely the right to observe and record what he does occur.

The second of these techniques, the interview, provides the means to collect rich introspective data that goes beyond mere observations of events and behaviours and approaches explanations. Use of these introspective techniques, though, necessitates two assumptions: (a) the individual is capable of relating the behaviours that he exhibits and that (b) what he does relate is a fair representation of what actually happens.

The use of stimulated recall to supplement the interview is a methodology that has gained in populatity over the past few years. Such an introspective technique has been used to advantage in discovering teachers' thoughts during teaching and, in particular, during the process of decision making. However, the literature does point to problems that may be encountered in the use of stimulated recall as an adjunct to the interview.

First, there are dangers in isolating the teacher from the environment. The researcher must take into account the subject as a part of the environment and must treat the investigation in a "synoptic" light (Clark, 1978). Second, there is the possibility that the subject may forget introspective data that may be of a threatening nature. Third, there is the problem of data distortion which is caused by the collection of data during stimulated recall interviews that were not present during the execution of the subject's behaviour. Fourth, there is potential discrepancy between the subject's "logic-in-use" and subsequent "reconstructed logic" as produced during the interviews (Oberg, 1975:96). Finally, one must have regard for the effects that stimulated recall interviews might have upon the subject's behaviour. McDonald and Solomon (1970), Gres and his associates (1971), Fuller and Manning (1973), and Dawson, Dawson and Forness (1975) have thoroughly examined the effects of self-viewing upon the behaviour of the subject. However, the degree of behavioural change that might occur through self-viewing during stimulated recall interviews has received little attention and, as such, there is little information available to provide answers to this concern.

The literature on naturalistic and introspective methodologies points to four additional problems. These relate to (1) timing and sequencing, (2) validity, (3) superficiality, and (4) evidentiary adequacy. Suffice it to say here, that in the implementation and reporting of such research the investigator must be cognizant of the potential problems and be prepared to deal with them in a realistic manner.

CHAPTER III: THE METHOD

PART I

THE METHOD

Overview

This research project was designed to explore and describe the phenomena of teacher interactive decision making. As the aim of the investigator was to add to the growing body of knowledge about teacher interactive decision processes, the case study approach was considered to be an appropriate mode.

The literature supports the use of the case study approach when the aim of the research is to add to existing knowledge (Simon, 1969; MacDonald and Walker, 1975; Stake, 1978). This methodology is designed to study one individual or group in detail without attempting to generalize findings and is, in Simon's (1969:52) view, the "jumping-off point for the study of new areas in the social sciences."

MacDonald and Walker (1975:2) claim that the case study is appropriate for a detailed examination of a subject's experience and the phenomena that constitute that experience. They characterize this methodology as "instance in action"; it is "the way of the artist, who . . . communicates enduring truths about the human condition

(MacDonald and Walker, 1975:3)."

In similar fashion, Stake (1978:7) views the case study as a method of expanding knowledge rather than reducing data. Insofar as it is primarily concerned with the knowledge and understanding of the particular, the case study is extremely useful for "adding to existing experience and humanistic understanding." Stake (1978:6,7) further emphasizes that this approach least violates the natural setting and the subject's experiences. This is important, in that the representativeness of the subject and the setting of the case are extremely important considerations in any attempt by the reader of a study to draw comparisons to his own situation or others within his knowledge. Added support comes from Erickson (1979a:17), who claims that concentrating on the minuteness of detail accounts for most salient differences within the "bounded unit of analysis", in this case the classroom.

This position is also adopted by Cusick (1973:5) when he states that data obtained from observation of one individual, while perhaps not generalizable, is transferable to others, since "what is reasonable behavior for one human being in a given situation will, at least in some way, be reasonable behavior for others, given the same situation." According to Cusick (1973:231), the uniqueness of the situation lies not in the social environment, such as the classroom, but in the human reaction to events or stimuli within that environment; thus "a good description of a social phenomenon, however unique, may be quite intelligible to one who never participated."

As a result of the review of the methodologies appropriate to this study, the specific techniques chosen include, (a) non-participant observation and (b) interviewing using stimulated recall. These two data gathering tools were considered to be most appropriate for the following reasons:

1. The heart of the study was the teacher's decision making behaviour. Therefore, there was no need for the investigator to record his thoughts, ideas or impressions of the daily routines of either the students or the teacher.
2. Only the teacher could provide description and explanation for her behaviours and only the teacher could provide information as to her thoughts during the formulation of her interactive decisions. The use of the stimulated recall technique was deemed appropriate, since it has been demonstrated that the subject's memory of interactive behaviours is stimulated by self-viewing.

The Subject

Selection of Subject Teacher

The choice of subject was determined largely by the availability of volunteers who met the following guidelines:

1. The teacher must express an interest in and a commitment to the study.
2. The teacher must have at least two years of teaching experience, must have been teaching in the school system for longer than one year and must have been teaching at the current grade level for longer than one year.

This second criterion was established to minimize role socialization problems experienced by teachers in their first year of teaching (Moskowitz and Hayman, 1974) and to reduce the effects of the problems that occur in teaching at a new grade level.

The teacher chosen as the subject for this study was a 26 year-old female who was employed by a large urban school board, who had four years' teaching experience with the same board, all at the grade six level, and who was in her second year at the same school.

The Setting

The subject classroom was of the open-area type. It was located in one portion of a large open area devoted to four classes and a library. The class consisted of twenty-eight grade six students.

Lessons Observed

Data were collected while the subject was teaching mathematics, reading, spelling, language, and leading a group discussion. Although an attempt was made to spread data gathering equally over the various lesson types, this objective was not achieved for the reasons noted below. In all one group discussion, one language period, three mathematics lessons, three reading lessons, and two spelling lessons were observed. On the average, each of these lasted 35 minutes.

Specific Problems

As many social science investigators may attest, the correspondence between the initial design proposal for a project and the finished report is seldom high. This study is no exception. Due to circumstances beyond the investigator's control, the aims originallly set for this project had to be changed to some degree.

These circumstances are not of direct relevance here, hence they are not detailed at this point. However, since they may be of interest to other researchers attempting similar enquiries, the circumstances that necessitated adaptations in the study design are outlined in Appendix D.

One major change that was necessary concerns the extent to which the teacher's interactive decision behaviours and processes varied with the time of year. In an attempt to gather data to provide information on this question, the investigator's original intent was to observe his subject in the Spring of 1979 and again in the Fall of 1979. However, this was not possible and only one session of data collection was conducted. The reasons are fully documented in Appendix D.

This study focussed upon two central issues, which give rise to four major research questions. The first issue deals with the the characteristics of a teacher's interactive decision making and presents three research questions:

1.1 What types of interactive decisions are formulated by classroom teachers?

A review of the literature leads to the suggestion that there are three major categories of teachers' interactive decisions: instructional interactional, managerial interactional, and environmental interactional decisions. This study had, as one of its foci, the identification and description of the categories of interactive decisions formulated by the subject.

1.2 What are the concomitants of teachers' interactive decisions?

The decision process is a complicated and intricate one; as such, there are many factors that play leading roles in the interactive decisions formulated by classroom teachers. Thus, a major portion of this study has been devoted to the factors involved in the teacher's decision making.

Another issue examined in this study concerns the extent to which the teacher employed heuristic techniques in the formulation of interactive decisions, and leads to the following research question:

1.3 To what extent do teachers employ heuristic techniques in the formulation of interactive decisions?

The literature appears to be contradictory with regard to a teacher's use of heuristic mechanisms in the formulation of estimates and judgements about students' states of mind, behaviour, and other characteristics. In order to provide additional information on this question, the researcher has examined the sources of information identified by the teacher as bearing on the formulation of interactive decisions and judgements and estimates of her students' states of mind, behaviour and other characteristics.

The second central issue of this study is an examination of the effectiveness of stimulated recall as a research tool in observing a teacher's interactive decision making.

As extensive use has not been made of the stimulated recall interview utilizing videotaping of teachers' classroom behaviours, there is a need to obtain more information about this research tool. In order to provide this information, three foci were adopted. First, the researcher focussed upon the possible problems or difficulties encountered in the use of videotape and stimulated recall interviews as research tools. A second concern centered upon the researcher's ability to identify the interactive decisions merely by observing the teacher's behaviours in the classroom. Third, the researcher focussed upon the teacher's ability to identify and describe the thoughts she had during the formulation of interactive decisions. Thus three sub-problems have been addressed:

2.1 *What problems are encountered and effects observed in the use of the videotape equipment in classrooms and in stimulated recall interview sessions*?

2.2 *Is an observer able to identify a teacher's interactive decisions from observation of the teacher's behaviours in the classroom*?

2.3 *Is a teacher able to describe the thoughts she had during the formulation of her interactive decisions*?

Data and Data Sources

Three types of data were collected during this study. The sources and procedures used to obtain the data are discussed below.

Videotapes of Lessons

Ten lessons of 30 to 45 minutes in length were videotaped. These videotapes were to be used as a permanent and easily retrievable record of each of the lessons observed and to provide stimuli that would prompt the teacher's recall of her thoughts during the formulation of interactive decisions.

Decision Chronology

A written chronology of the teacher's behaviour would help to clarify the sequence of decision behaviour. The primary purpose for the chronology was to provide information relevant to the research concern focussing upon the researcher's ability to identify a teacher's interactive decisions from observing the teacher's behaviour.

Stimulated Recall Interviews

Stimulated recall interviews were conducted as soon as possible after each of the 10 videotaped lessons. The purposes of these interviews were (a) to gather introspective data concerning the teacher's decision processes and (b) to gather data concerning the use of the stimulated recall interview as a research tool.

The Pilot Study

An intense period of training was required for the researcher to gain confidence and competence with the techniques of naturalistic research and the use of the various pieces of equipment used in this study. Hence, a pilot study was conducted over a one week period. The purposes of this field work were:

1. To gain experience with the handling and manipulation of audio-visual equipment within a natural setting.
2. To develop familiarization techniques within a natural setting.
3. To develop interviewing procedures and techniques.
4. To determine the suitability of stimulated recall methodologies for providing information to answer the research questions.

One grade six female teacher participated in the pilot study. The classroom was an open-area type within a large "pod". The "pod" contained five classes and a library. Although employed by the same Board of Education as the subject of the actual project, the pilot study subject taught in a different school.

During this one week period, four lessons were videotaped. These lessons were part of an innovative language arts program that the teacher was piloting for the Board. The investigator was in the classroom for five days.

When not videotaping teacher behaviours, the investigator conducted familiarization moves suggested by Marland (1977) and Conners (1978). These familiarization moves included breaking-down and re-assembling the videotape equipment and stopping and rewinding the video-recorder several times during each of the lessons.

The audio tapes of the stimulated recall interviews were submitted to a staff member of the University of Alberta. This was done in order that the investigator might receive feedback on his interviewing style and on the relevance of the data collected during the interviews.

The following are the results of the pilot study:

1. A period of one week was apparently sufficient to desensitize both the students and the teacher to the presence of the investigator and the audio-visual equipment in the classroom. After the fourth day in the classroom, there were few overt signs of distraction or discomfort with either the presence of the investigator or his equipment.
2. During the stimulated recall interviews not all the stimulus points identified by the investigator were perceived by the teacher as decision points.
3. It was observed that although the teacher was invited to stop the videotape when she viewed behaviour perceived as decision making she seldom did.

4. When the investigator stopped the videotape, the teacher was able to recall her interactive thoughts.

Data Collection Phases

There were three distinct data collection phases in this study. These were: (a) the familiarization phase, (b) the lesson videotape phase, and (c) the stimulated recall interview phase. Much guidance was taken from the studies conducted by Marland (1977), Conners (1978a), and King (1979). From these sources have been drawn the techniques and procedures employed in this study.

Familiarization Procedures

Three familiarization phases or procedures were used in this study. These included (a) an initial contact with the teacher and the principal of the school in which the subject taught, (b) a classroom familiarization, and (c) an interview familiarization. Each of these is discussed and described in detail below.

Initial Contact

In separate interviews, the investigator met with the teacher and the principal of the school in which the teacher was located. The purposes for these meetings were:

1. To discuss the nature of the study.
2. To outline the commitment to be asked of the teacher and the principal, in terms of task and time.

3. To negotiate the degree of commitment that the teacher and the principal would be willing to accept.
4. To discuss guarantees of anonymity.

As the subject of this study was a volunteer, much care was taken to ensure that the terms of the commitment were understood and genuinely accepted by the teacher, the principal, and the researcher. The terms of the teacher's commitment were as follows:

1. The teacher would accept the investigator into the classroom over a three week period to videotape the teacher's instruction. As the afternoon of each day was fragmented, due to rotation of classes, the videotaping sessions were limited to the morning.
2. After each videotaped session the teacher would meet with the investigator to discuss the decisions she had formulated during her lessons. Due to the teacher's extremely busy schedule at the end of classes, it was agreed that these interviews would occur during the lunch hour. The teacher agreed to keep her lunch hours 'free' in order to conduct the interviews without interruption. Only one interview session had to be cancelled and the only interruptions experienced were two telephone calls.
3. The teacher agreed to a second round of data collection

in the Fall. However, as is discussed in Appendix D, this did not occur.

The principal's commitments to the study were as follows:

1. The principal agreed to allow the investigator to conduct his study in the school.
2. The principal agreed to support the teacher in the study by relieving her of supervisory duties that normally would have fallen upon her during the noon-hour.
3. The principal agreed to provide the researcher with a room in which to conduct the post-lesson interviews in privacy.

The investigator also stated his commitment to the study and to the teacher, as follows:

1. The researcher agreed to spend no more than three weeks in the classroom during each phase of data collection. Due to the loss of two videotaping sessions, as a result of a school holiday and a special function in the school, additional sessions were arranged.
2. The investigator agreed to maintain complete school and teacher anonymity.
3. The investigator agreed to present the principal and the teacher with summary reports of the completed study.

This negotiation process was viewed by the investigator as being of utmost importance in establishing trust between the teacher, principal and investigator.

Classroom Familiarization

The purposes of the classroom familiarization moves were to attempt to ensure that both the teacher and the students were desensitized to the presence of the researcher and his equipment prior to the collection of data. The following are the procedures employed:

1. A few days before the commencement of the classroom familiarization phase, the investigator visited the classroom and introduced himself as a visitor. The students were informed that the purpose of the investigator's presence in the class was to learn more about the teaching/learning process. As well, the need for the videotape equipment was mentioned and the students were encouraged to express their concerns and feelings about being videotaped.
2. Following this discussion, parental consent forms were distributed.
3. Students were given the opportunity to familiarize themselves with the videotape equipment and to the process of recording and playback. This stage was accomplished with the following strategies:
   (a) The students were introduced to and interviewed by

the teacher while videotape equipment was recording the proceedings. These interviews were subsequently played back to the students.

(b) The students were allowed to videotape each other during a free-time period. This videotape session was played back to the students.

(c) The investigator "tore-down" and "rebuilt" the videotape equipment several times in order to desensitize the students to these procedures.

During this one week classroom familiarization phase, the investigator observed that the distraction effects of the investigator's presence and of the videotape equipment gradually diminished. By the end of this phase, few students overtly paid any attention to the investigator or his equipment. Technical skills were also polished.

Interview Familiarization

During the pilot study, the investigator observed that (a) the teacher became more involved in the interviews and (b) provided more insightful data concerning her decision behaviours when she understood the decision process and when she was able to recognize her interactive decisions. The investigator initially spent considerable time with the teacher in discussing her views of the decision process and its various elements.

This time spent with the teacher prior to the stimulated recall interviews lead to beneficial outcomes, namely the building of trust between the subject and the researcher. For this reason, a similar series of discussions was conducted with the subject of this study. In all, five familiarization interviews were conducted prior to the collection of interview data.

By way of summary, the 3 purposes of the interview familiarization phase were:

1. To acquaint the teacher with the equipment and procedures to be employed during the interviews.
2. To develop a personal relationship with the teacher.
3. To enable the teacher to overcome any apprehension or anxiety she might have felt with the use of the equipment and with the teacher-investigator interaction during the interviews.

Videotape Recordings

During the period April 16 to May 2, 1979, the investigator recorded 13 lessons on videotape. Of these, 10 were used in the stimulated recall interviews. These lessons included:

3 Mathematics Lessons
3 Reading Lessons
2 Spelling Lessons
1 Group Discussion

1 Language Lesson

The equipment used to videotape these lessons included one Sony Videocamera Model: CVC 2100A, one half-inch reel-to-reel Javelin Videotape Recorder Model: VTR 2000, one Sony Television Monitor Model: 110, and one Sony Microphone Model: ECM 150, worn by the teacher.

Unfortunately, wireless microphones were not available for this study. This necessitated the teacher dragging 20 feet of microphone cable along with her as she conducted her lessons. The effects of this inconvenience were impossible to measure but assuredly there were negative effects; the teacher mentioned her discomfort with the cord whenever she stepped on the cable or whenever the cable snagged on a student's desk.

The investigator took advantage of the physical setting of the classroom and was able to essentially isolate himself and the videotape equipment from the classroom and still observe all activities within the classroom. The camera was placed at the rear and to the right of the room in an aisle that separated the class from other classes in the area. A one-metre high wall separating the classroom from the aisle effectively shielded most of the equipment from the students.

The general recording strategy was that the camera would focus on the movements of the teacher and the students. Since the purpose of this study was to explore the interactive decision making behaviours of the teacher, most attention was devoted to the movements of the teacher. Students within the class received attention when the investigator noticed behaviours that attracted the teacher's attention.

During the recording, a decision chronology was maintained by the researcher. This chronology recorded apparent decision points so that they could be easily referred to during later stimulated recall interviews. These perceived decision points were recorded against a VTR counter reading (See Appendix B for an example of a portion of a decision chronology).

After each observation session, the investigator reviewed the videotape. During this review, the investigator attempted to disconfirm the decision points recorded on the decision chronology. In addition, an attempt was made to identify decision points not identified during the videotaping.

The Stimulated Recall Interviews

During the interview familiarization phase, the investigator conducted a discussion with the teacher about her perception of the decision process, the elements of decisions, and instructed the teacher in the operation of the videotape playback unit. The benefits of the discussion were viewed as being the teacher's ability to articulate her perceptions of decision behaviours.

In all, there were ten stimulated recall interviews. Nine of the interviews conducted with the teacher occurred during the lunch hour and lasted from 30 to 55 minutes. The tenth interview was conducted on the last afternoon over a sixty minute period following the lunch hour.

Many types of questions were used by the investigator during the interviews. Although an interview shedule was developed, it was not rigidly followed. As a result of the pilot study, the investigator determined that a combination of specific and general questions was required. These took the following form:

General Questions:

What thoughts were going through your mind at that point?

Could you tell me what you were doing there?

Were you aware of what you were thinking?

Focussed Questions:

Why did you say that?

What did you observe about Michael's behaviour?

What was your estimate of Ken's behaviour at that point?

What information were you aware of processing at that point?

Care was exercised to avoid the use of evaluative or judgemental questions and comments. As well, use was made of the encouraging, receptive and interested stance advocated by Fuller and Manning (1973:499):

> . Helping persons have CARE: Communicated Authenticity, Regard for the other person which is positive, and Empathy. Their communications are concrete and "immediate", that is, addressed to the subject's present and psychological state.

In order to take this approach effectively, the investigator displayed support for and understanding of the teacher's comments about her behaviours. Conscious efforts were made to avoid the use of leading questions.

PART II

TREATMENT OF THE DATA

This section presents an overview of the development of the Content Analysis System (CAS) that was specifically designed for this study. The CAS was developed through inductive means following the the guidelines established by Holsti (1968, 1969).

Holsti's (1969:14) procedure for content analysis is based upon three main principles: objectivity, systematism, and generality. It provides a framework "for making inferences by systematically and objectively identifying specified characteristics of messages (Holsti, 1969:14)." When the analysis follows the principle of objectivity, it adheres to explicitly formulated rules and procedures that ensure that the "analyst's subjective predispositions (Holsti, 1969:4)" are not reflected in the analysis. Systematism allows for the inclusion or exclusion of specific content or categories according to consistently applied rules. The third of Holsti's principles, generality, demands that the findings of the content analysis have theoretical relevance, as dictated by the researcher's applied theory.

The process of content analysis involves the sorting of data into categories that reflect the researcher's questions and that are developed from clearly defined variables. These definitions must be true to both a conceptual and operational base and must be representations of the analyst's concepts (Holsti, 1969:95). Data obtained from the transcripts of interviews are "systematically transformed and aggregated into units that permit precise description of relevant content characteristics (Holsti, 1968:644)."

The Content Analysis System

Four distinct procedures were followed in the development of the CAS. These procedures were:

1. The stimulated recall interview data were first divided into two types: decision related data and non-decision related data.
2. The decision related data were then divided into interactive and non-interactive phenomena.
3. Both types of decision related data were segmented into units of thought or idea (Marland, 1977; Conners, 1978a). A unit of thought may be considered to be a single word, portion of a sentence or portion of a paragraph, if in that unit is contained the statement of one complete thought or idea (Guetzkow, 1950:50).
4. Finally and most importantly, the decision related data were examined to determine whether the distinct types of

thought units--distinguished on the basis of common characteristics --could be extracted. The review of the literature has determined that there are three primary interactive decision categories: instructional, managerial, and environmental, that there are decision stimuli that generate within the teacher a felt need to change behaviour, and that there are pieces of information perceived during the decision moment.

Statistical Analysis

Following the categorization stage of the CAS, the data were further analyzed to determine the frequencies of the following occurrences:

1. Instructional and managerial decisions in the lessons observed.
2. Perceived stimuli for instructional and managerial decisions.
3. Reported information for instructional and managerial decisions.
4. Alternatives considered for interactive decisions.
5. Feedback information reported following the implementation of interactive decisions.
6. Congruence of interactive decisions.
7. Reported rationales for implementation of interactive decisions.
8. Information used in the formulation of estimates.

Content Analysis Reliability

Four reliability concerns were addressed in this study. These concerns are:

1. Reliability of the system that was used to distinguish decision related data from non-decision related data.
2. Reliability of the system that was used to distinguish interactive from non-interactive data.
3. Reliability of the system that was used to segment the transcript data into units of thought.
4. Reliability of the system that was used to categorize the data into various elements of interactive decisions.

Each of these concerns was examined from an intracoder as well as an intercoder perspective.

Holsti's (1969:138) Dichotomous Decision Technique for establishing reliability coefficients was applied to test the reliability of the systems that were used to distinguish decision related data from non-decision related data and interactive from non-interactive data. The Dichotomous Decision Technique focusses upon a single decision moment at a time and calls for a review of the criteria for choice at each step in the coding process. Complete descriptions of the criteria for choice and the coding process are to be found in Appendix A. In this way, the chances of reliability loss are decreased as the number of categories developed increases. According to Holsti (1969:139) the Dichotomous Decision Technique ensures that coding choices follow a logical sequence. In addition, it allows the investigator to determine the location of a breakdown in intracoder and intercoder judgement agreement.

Holsti's (1969:140) ratio of coding agreements to the number of coding decisions was used:

$$C.R. = 2M/(N1 + N2)$$

where "M" is the number of coding decisions on which two judges agree, "N1" is the number of judgements made by judge 1 and "N2" is the number of judgements made by judge 2. A coefficient of 1.0 is an indication of total agreement. However, a coefficient of reliability in excess of 0.7 has been accepted by Holsti (1969:141) and Marland (1977:85).

In establishing a coefficient of reliability of the coding system employed to unitize the interactive decision related and non-interactive decision related data (reliability concern #3), Guetzkow's (1950:50) ratio was used:

$$u = (01 - 02)/(01 + 02)$$

where "01" and "02" represent the number of units obtained by judge 1 and 2 respectively. A coefficient of reliability of zero is considered by Conners (1978:110) and King (1979:123) to indicate perfect agreement.

To establish the coefficient of reliability of the coding system that was used to categorize the unitized data, the Scott (in Holsti, 1969:140) ratio was employed:

$$\text{Reliability} = (Po - Pe)/(1 - Pe)$$

where Po, or the observed percentage of agreement, is the percentage of judgements upon which judge 1 and judge 2 agree and Pe, or the expected percentage of agreement, is the percentage of agreement that could be expected by chance. The Scott formula has been accepted by Holsti (1969), Marland (1977), Conners (1978a), and King (1979) as the most appropriate formula in the test of the reliability of categorizing systems. As with Holsti's coefficient of reliability, Marland (1977:85) and Conners (1978a:110) have agreed that 0.7 is an acceptable coefficient. King (1979:117) views, though, that a lower limit of 0.8 is more appropriate, due to the complexity of systems designed to categorize introspective data.

Intracoder Reliability

All the stimulated recall interview data were coded by the investigator. A coefficient of intracoder reliability was established for the four steps in the CAS. On two occasions, several months apart, the investigator calculated the intracoder reliability coefficient using 15 decision discusions randomly selected from the transcripts. Table 1 details the coefficient of reliability for the four intracoder reliability checks. They appear to be quite high and acceptable (Holsti, 1969; Marland, 1977; Conners, 1978a; King, 1979).

Intercoder Reliability

As with the checks for intracoder reliability, a coefficient of intercoder reliability was established for each of the four steps in the CAS. A doctoral student familiar with the process of checking for intercoder reliability acted as coder. Fifteen decision discussions were randomly selected from the transcripts and subjected to the four steps in the CAS by the alternate coder and the results were compared with the principal coder's classifications. Table 2 displays the coefficient of reliability for each of the four intercoder reliability checks. Although the intercoder coefficients of reliability are lower than the intracoder coefficients, they are well above the minimum levels established by Conners, Holsti, King, and Marland.

TABLE I

Intercoder Reliability On CAS Coding Of Interview Data

CODING	COEFFICIENT OF RELIABILITY
Decision Related Versus Non-Decision Related Data	0.85
Interactive Versus Non-Interactive Data	0.90
Unitization Of Transcript Data	0.09
Categorization Of Transcript Data	0.84

TABLE 2

Intracoder Reliability On CAS Coding On Interview Data

CODING	COEFFICIENT OF RELIABILITY
Decision Related Versus Non-Decision Related Data	0.89
Interactive Versus Non-Interactive Data	0.93
Unitization Of Transcript Data	0.03
Categorization Of Transcript Data	0.88

Assumptions

This exploratory investigation of the processes of teacher interactive decision making was based upon the following assumptions:

1. Teachers formulate both covert and overt interactive decisions during the act of teaching.
2. The use of exploratory techniques is assumed to be suitable for investigating teacher interactive decisions. With regard this particular study, the assumption has been made that the introspective approach utilizing the stimulated recall interview is highly appropriate.
3. A five day period of familiarization is adequate to ensure that both the teacher and the students are desensitized to the presence of the investigator and his equipment and, therefore, display behaviours that approximate their normal classroom ~~behaviours~~ behaviours.
4. During the stimulated recall interview, the subject teacher is able to identify and report both overt and covert decisions and the concomitants of these decisions.
5. The sample of interactive thoughts recalled during the stimulated recall interviews, are illustrative of the teacher's interactive thoughts throughout the lesson.

Limitations

The one major limitation of this study was the use of only one subject in one setting. As a result, any findings generated from this study had no basis for generalization. Minor limitations included:

1. The possible inability of the subject to remember all thoughts during the videotaped session.
2. The possible inability of the subject to articulate interactive thoughts during the stimulated recall interviews.
3. The possible reluctance on the part of the subject to articulate all interactive thoughts during the stimulated recall interviews.
4. Unforeseen environmental and/or psychological constraints.

CHAPTER IV: THE FINDINGS

CHAPTER IV

FINDINGS

Overview Of Chapter IV

Since this study addressed two primary issues:

1. The characteristics of a teacher's interactive decision making
2. The examination of the effectiveness of stimulated recall as a research tool in observing a teacher's interactive decision making

the data of this investigation were analyzed in two stages and the findings of this Chapter are presented in two parts. Part I highlights characteristics of the interactive decision making process. Analysis at the micro level isolates the various types of interactive decisions that were made and identifies some concomitants of interactive decision formulation; analysis at the macro-level identifies findings concerning the teacher's use of heuristics during the formulation of estimates and judgements and global patterns and trends in the teacher's formulation of interactive decisions--trends not identified during the micro-level of analysis.

The macro-analysis of the stimulated recall interview transcripts was designed to supplement the micro-analysis. Specifically, the results of the macro-analysis were used to provide information for the research questions dealing with (a) the the use of heuristic techniques in teacher decision making and (b) global patterns and trends.

Part II presents findings dealing with the methodology used in this study. The data were analyzed at the macro-level and are concentrated around (a) the use of exploratory research in this project and (b) the use of stimulated recall interviews.

PART I

CHARACTERISTICS OF INTERACTIVE DECISIONS

Overview

Part I presents the findings of the analysis of the stimulated recall interview data, at both the micro and macro levels. These findings have been organized into the following three sub-sections:

1. Types of Interactive Decisions
2. Concomitants of Interactive Decisions
3. Global Patterns and Trends

The second section, "Concomitants of Interactive Decisions", has been further delineated to examine various factors of interactive decision making. These factors include:

(a) Decision Antecedents,

(b) Decision Information,

(c) Heuristic Techniques Used In Assessment and Estimate Formulation,

(d) Decision Congruence and Feedback, and

(e) Decision Rationale.

Types of Interactive Decisions

During the stimulated recall interviews, the teacher identified 242 interactive decisions. Analysis of the data indicates that there were two first order categories of interactive decisions formulated: instructional decisions and managerial decisions.

Interactive instructional decisions are defined as those decisions that relate to the presentation of instructional material and student learning. Interactive managerial decisions are defined as those decisions that relate to student behaviours that are perceived by the teacher as interfering with, distracting, or disrupting the learning and/or instructional process. Examples of both interactive instructional and managerial decisions are provided in the sections immediately following this.

Sub-Categories of Instructional Decisions

Four sub-categories of interactive instructional decisions were identified during the micro-analysis of the stimulated recall inteview transcripts. These are:

1. Instructional Strategy Decisions
2. Student Questioning Decisions
3. Null Instructional Decisions
4. Planning Decisions

Instructional Strategy Decisions

Instructional strategy decisions are defined as decisions dealing with the delivery of instructional material or the development of students' skills. Decision 11 illustrates the teacher's decision to use student involvement in the decision process as a means of delivering instructional material.

Decision 11

> T: Um, Michael had brought . . . the book up . . . and he'd found this particular story and we had been talking a little bit about, previous to that, about some of the things that different magicians had done, so on. . . . so I asked them (the students) if they would like to either read the story about him as a child or read one of his feats.

Decision 42 provides another example of an instructional strategy decision. The teacher had apparently just elected to use a particular instructional strategy to impart information to the students. In this example, the teacher's perception of one student's behaviour and her estimate of other students' states of cognition stimulated her felt need for an interactive decision.

Decision 42

> T: So, and then I repeated each one slowly for her, as her voice is quite quiet.

Decision 81 is an example of the teacher making a decision about the form that the instructional material would take.

Decision 81

> T: O.K., favourable. Well, favour can be spelled either way, so I, uh, Terry asked me if it can be spelled one way or the other and I said, "Yes, fine, that's o.k." . . . I knew that someone would bring it up, because favour was a word we had on the list a couple of weeks ago . . .

Decision 114 depicts the teacher choosing to pursue an instructional point.

Decision 114

> T: And I thought, well, that's fine. I'm going to see if I can get her to answer. And she said, "Well, I don't know." But she knew very well what the answer was. She just didn't want to participate or make any effort at thinking. So I pursued her and tried to get an answer from her.

Decision 124 shows an interactive decision not to pursue an instructional point.

Decision 124

> T: So, um, I wanted to continue talking to her or go to someone else. Because she seemed to be very unsure of herself, for some reason. And, you know, I didn't want to make her feel bad or anything. . . . Ya, I asked someone else.

Other sub-groups of reported instructional strategy decisions include

a. the decision to respond in a particular manner to a student's request,

b. the decision to request a student's aid,

c. the decision to check for work completion, and

d. the decision to check students' understandings.

Decision 144 illustrates the sub-category of interactive instructional decision to respond in a particular way to a student's request for aid.

Decision 144

> T: She asked me if I'd glance at it and see if it looked o.k. And then she said she would continue on with the rest of it, if it was alright. And I said fine. I wouldn't say no, it wasn't any good. I would never do that. I would say, "That's fine, you go ahead and finish off whatever line . . . whatever you want to."

Decision 220 presents an example of the teacher choosing a student to run an errand that involved instructional material.

Decision 220

> T: Same old story. No more books. Well . . . you know, I still had Michael on my mind and I didn't particularly have any patience for Audrey at that point. Um, so I asked Jennifer if she would, you know, go check in the other classroom and, um, you know, she's pretty good about doing things like that.

Only two of these requests were made. In both cases, the same student was called upon to fulfill the request.

Decision 1 shows the formulation of a decision to check for work completion.

> Decision 1
>
> T: It must have been Tammy who said that. I don't remember what she said but it influenced me to sort of ask as to whether the other students had done it as well, I believe.
>
> I: O.K. Can you remember the kinds of thoughts that were going through your mind at the point that you asked that question?
>
> T: Ya, I sort of wondered if anybody had, you know, how many students had completed, because yesterday they didn't have . . . well they had some time in class but they didn't have a lot. And, um, just from the shuffling that was going on and stuff, I sorta got the feeling that not too many people had it done. So, um, so I just sort of carried it on from there and I asked if the students . . . whether or not they did have it done.

Decision 96 is an example of an interactive decision that is associated with the students' understanding of an instructional point. In this instance, the teacher was checking her perception of a student's apparent confusion with the concept of fractions.

> Decision 96
>
> T: I went back to Michael because I wanted to see what he would say, if he was continuing to be confused about, you know, about the fraction and the pictures, because it was an identical kind of situation that was at the top.

Student Questioning Decisions

A student questioning decision is defined as a choice to ask a question of a specific student, as distinct from a decision to pose a question to the entire class or to a group of students. The following are examples of decisions to pose a question to a particular student.

Decision 91

T: It had crossed my mind several times that he had been away and that, you know, that I wanted to make sure that he knew what was going on and that sort of thing. . . . So I guess that I was sort of attracted to him and, uh, you know, and asked the specific questions.

Decision 98

T: And he really wasn't watching his book or paying attention. I didn't know what he was watching, so I asked him and I don't think he was so I let him try and look at the picture and see if he could answer it.

Decision 113

T: I asked Mary the first question. . . talked to her first because she was sort of wandering and she didn't seem to be cluing in and I persisted on continuing to ask her because I didn't think "frequent" was a difficult word for Mary and her ability.

Decision 169

T: O.K. I asked Steven that question, um, because I didn't think it was a particularly difficult question . . . So I asked him that question just to see if he could answer it and he said no, he couldn't.

Of these four preceding decisions, numbers 98 and 113 appear to be as much managerial decisions as instructional decisions. Such phrases as " he really wasn't watching his book or paying attention" and "because she was sort of wandering and she didn't seem to be cluing in" are managerial statements. However, as the questions concerned instructional material, they have been classed as instructional decisions.

Null Instructional Decisions

A null instructional decision, or default decision (Brown and Farr, 1971), is a conscious, deliberate choice to continue with behaviour that had already been initiated. The following are examples of null instructional decisions.

Decision 15

> T: . . . I wanted to keep the conversation going because I asked Ron the question and they interrupted and I wanted to keep it going, so I didn't stop to talk about it. I just kept on, sort of thing.

During the reporting of Decision 15, the teacher talked of reaching a decision point, as evidenced by: ". . . because I asked Ron the question and they interrupted and I wanted to keep it going . . ." Although the teacher recognized this decision point, she decided to continue with her pre-decisional behaviour: "I just kept on."

Decision 57

> T: I don't know what she meant by that. It was really strange . . . . I was sort of wondering, but I knew my

> time was real short, so I thought, well, I'll just let that go by. I was really curious about what she meant.

In this example of a null instructional decision, the teacher reported conflicting forces--her curiosity and the time available--but rather than changing her behaviour and asking for an explanation, she decided to continue with her pre-decisional behaviour.

Planning Decisions

An interactive planning decision is a conscious, deliberate choice to change an existing plan or to formulate a plan for future action during an interactive moment.

Decision 139

> I: Was this something that you had planned to do?
>
> T: Well . . . not ahead of time. But I had . ... as I was standing there, I had realized that I had been reading all the sentences so I switched and had them (the students) read the sentences and give the answer, rather than having me read.

This example demonstrates a planning decision. The teacher has decided to abandon one strategy in favour of another. This is distinct from an instructional strategy decision in that an implemented approach was changed, rather than an instructional strategy being formulated for implementation.

Decision 240

> T: . . . they've been asking for . . . for a spelling bee or games and things like this, for quite a while. So, I thought, well, why not, you know. So I said,

> "Well, we'll do it next week, if you want to and bring in some things from home and, uh, we can have a spelling bee on Monday and, uh, play some games." and so on. So I said sure, o.k.

Decision 240 shows an interactive decision to plan a future event. The decision was partly based on information that was not reported above. The teacher recalled her planning such activities with another class, ". . . I had done it with the other class and I haven't done it with these kids yet."

Sub-Categories of Managerial Decisions

Three sub-categories of interactive managerial decisions were identified during the micro-analysis of the stimulated recall interview transcripts. These were:

1. Managerial Strategy Decisions
2. Desist Decisions
3. Null Managerial Decisions

Each of these sub-categories is defined, illustrated and briefly discussed below.

Managerial Strategy Decisions

An interactive managerial decision is a conscious choice by the teacher to manage student behaviour. The following are examples of interactive managerial strategy decisions.

Decision 8

> T: . . . when I sorta gave the instructions and asked them to read, they opened their books swiftly and sort

of got started on it.

I: So, your assignment of that reading was . . .

T: Just to help settle the room down.

In Decision 8 the teacher reported the use of an instructional strategy: ". . . when I sorta gave the instructions and asked them to read . . ." in order to change student behaviour: "Just to settle the room down."

Decision 60

> T: . . . Michael wanted to make a comment and . . . Christine was sort of into her answer and I didn't want her to, like I didn't want her to be interrupted and I wanted to let her finish. So I said (to Michael), hang for a second.

Decision 60 demonstrates the teacher deciding to use a specific behaviour managerial strategy during the occurrance of an interruption.

Similarly, in Decision 132, a specific managerial strategy had apparently been decided upon, this time to minimize the effects of the teacher's intervention:

Decision 132

> T: She's like that once in a while. You know, she'll sort of throw a tantrum. And I . . . I didn't want to make a big deal out of it. So I just said, "Well that's too bad." and, "I guess you'll just have to sit down and we'll . . . later on, if you wish and you want to work on the rest of your sheets out there, that's fine. There's no problem. Right now, everybody's together."

Decision 88

> T: And I wanted to get started, so again I didn't demand that they move back to their desk and . . . cause another commotion and get everybody moving again. I thought, well, I'll just leave them there and, if I have to speak to them, well I will.

Decision 88 is an example of a interactive managerial decision not to pursue a particular strategy.

Decision 196

> T: You know, he had his book open and . . . I don't think he was using it at the time, or anything. But I could tell that he wasn't paying attention . . . So I went to him and asked him the question and then, of course, he wasn't.

Decision 196 illustrates the teacher's use of questioning as a managerial strategy. The focus upon student behaviour managerial is clearly indicated by the statement of intent that was subsequently provided: "But I just wanted him to get into the lesson and, uh, not have any hassle, sort of thing, if at all possible."

Desist Decisions

Desist decisions are conscious teacher choices to halt a student's behaviour. Three types of desist decisions were identified in the micro-analysis of the stimulated recall interview data. These were:

1. Verbal Desist Decisions
2. Non-Verbal Desist Decisions
3. Pre-emptive Desist Decisions

Verbal Desist Decisions. Verbal desist decisions are decisions to verbally halt a student's behaviour. The following are examples of verbally signaled desist decisions.

Decision 49

> T: Um, I noticed that Terry was talking to Diana and I just said his name and nodded at him just so that he would just bring . . . his attention.

In the effort to stop Terry's behaviour, the teacher decided to use a combination of verbal and non-verbal strategies: "I just said his name and nodded at him . . ." In most instances during which a verbal signal was employed, the teacher called the student by name. As evidenced by student behaviours that were recorded on videotape, this appeared to be sufficient to cause the student to cease the behaviour that the teacher had decided was inappropriate. The following examples have been verified by viewing the videotapes.

Decision 49

> and he knew, sort of that he was talking and he was quiet and listened. So I didn't have to say anymore.

Decision 164

> So, and that was all he needed, you know. He just nodded and looked at me and then he went on and looked at his work.

However, in some cases this strategy did not satisfy the teacher's intent, in which case another decision was often formulated, as in the following example:

> Decision 71
>
> T: Ah, I noticed Stan was doing some of his magic tricks and I just said his name and caught his eye . . . I just said his name and hopefully . . . hoping that he'd put it away, whatever he had and that would be the end of it. But it wasn't.

The negative feedback received by the teacher precipitated the formulation of another interactive decision, a managerial strategy decision:

> Decision 72
>
> T: And then . . . he had some matches . . . But I asked for them and I said, "Well, sit over here a minute", you know, "until you're sort of ready to go back with the rest of the guys." So, and he was quite willing to sit there. . .

Non-Verbal Desist Decisions. Non-verbal decisions are conscious choices to stop behaviour of others through the use of non-verbal methods, for example a nod, a glance, or a tap on the shoulder or head. The following are illustrative of the teacher having formulated interactive non-verbal desist decisions.

> Decision 6
>
> T: I think I was paying more attention to Jennifer, because she was starting to go to Laura and, instead of saying something to her, I just caught her eye . . . and just started looking at her . . .
>
> Decision 70
>
> T: I'd looked at him earlier . . . previous to this and not said anything and he caught my eye and put it away.

Pre-emptive Desist Decision. During the stimulated recall interviews, the teacher reported the formulation of one pre-emptive desist decision, which is defined as a conscious choice to pre-empt an anticipated student behaviour.

Decision 27

> I: Why did you mention that?
>
> T: Well, because whenever I read to them, this is a great past time. They tie one another's shoelaces together and they try to do it when no one's watching. So, consequently, when the story's over, we have people falling all over the place. . . . The kids know that they do this kind of thing so they all kinda giggled and I said, well that's fine. . . . Um, you know, sort of to bring it to their attention that hopefully this won't happen and I won't have to speak to them and I'm glad I didn't, so.

Judging from the teacher's report of the feedback she perceived, feedback that was verified on the videotape recording, the teacher's prediction of student behaviour appeared to be accurate.

Null Managerial Decisions

A null managerial decision, or forfeit decision (Brown and Farr, 1971) is defined as a conscious, deliberate choice to continue with pre-decisional behaviour. The following are examples of null managerial decisions.

Decision 7

> T: Uh, we are short of books in the classroom, and so I didn't object to that and we didn't seem to be, you know, um, abusing the right or the privilege of sitting together, so I didn't say anything. . . . I just decided

> to let it stand as it was and decided that I wouldn't ask them to sit in their desks by themselves.

Decision 7 illustrates the teacher's use of the null decision in a positive way. Her assessment of the students' behaviours prompted her to not intervene and change her students' behaviours.

Decision 75, although it is another null managerial decision and appears to be similar to Decision 7, is a null managerial decision of a quite different type. Whereas the rationale for Decision 7 was the teacher's estimate of her students' behaviours, the rationale for Decision 75 was the teacher's estimate of the effects of her intervention upon other students in the classroom. In this way, Decision 75 was not as positive in its orientation as was Decision 7.

> Decision 75
>
> T: I sort of glanced at them and . . . I noticed that Christine was sort of paying attention. . . . They were quietly reading and, uh, I sort of noticed that they were sort of looking up once in a while, whenever the T.V. sort of caught their attention. . . . Um, you know, I was just hopeful that they would, you know, pay attention and watch, but I didn't want to make too much of a commotion . . . so I just left it as it was and I didn't say anything.

The Concomitants of Interactive Decisions

Four types of major concomitants, or factors involved in the decision process, were identified through the micro analysis. These were (a) decision antecedents, (b) decision information, (c) heuristic techniques used in assessment and estimate formulation, (d) decision congruence and feedback, (e) decision rationales, and (f) global patterns and trends. Each of these concomitants is defined, illustrated, and briefly discussed below.

Decision Antecedents

A decision antecedent is defined as an event, behaviour, or perception that stimulates a felt need in the classroom teacher to formulate an interactive decision.

The micro-analysis of the stimulated recall interviews has lead to the identification of three categories of decision antecedents. These include:

1. Student Originating Antecedents
2. Teacher Originating Antecedents.
3. Environment Originating Antecedents.

Student Originating Antecedents. Student originating antecedents are defined as those verbal and non-verbal student behaviours that prompted the teacher to formulate interactive decisions. Below are examples of decisions that have been prompted by antecedents categorized as student originating (underlined).

Decision 9

> I: What were you thinking at that point?
>
> T: Ah, well. I was trying to concentrate on what Amanda was telling me and I didn't think that there were a couple of students that, uh, were perhaps listening to what she was saying . . . . so I was sort of scanning just to see . . . and I thought that perhaps I could catch their eye and that would be enough. . . .

This example demonstrates the teacher's focus upon the verbal behaviour of one student: "I was trying to concentrate on what Amanda was telling me . . ." and, at the same time, she reported her estimate of the cognitive states of other students in the classroom: ". . . and I didn't think that there were a couple of students that, uh, were perhaps listening to what she was saying. . . ."

The above example illustrates another common phenomenon--decisions reported by the teacher were usually stimulated by more than one antecedent. In this instance, the first antecedent was individual student initiated behaviour and the second was the teacher's estimate of the cognitive states of the rest of the students.

Below are further examples of interactive instructional decisions formulated following the teacher's perception of student behaviours.

Decision 128

> T: I think Mark had his hand up that particular time and it caught my eye. So I, you know, I asked him. . . . He seemed to be ready to answer . . . and he didn't have the right answer, so then I tried to go on

from there.

As this example shows, the decision was stimulated by the student's response. The particular decision arrived at was influenced by the information the teacher was processing at the time, namely her assessment of the student's response: ". . . and he didn't have the right answer. . . ."

Another example of this kind of antecedent-decision combination occurs in Decision 235:

> Decision 235
>
> T: I just got the feeling that everybody wasn't . . . didn't quite grasp what she was trying to say. I think that everyone understood what she meant in the second one but the first . . . I wasn't sure. So I sort of re-stated it again in another way, just for the benefit of everybody else.

Implicit in the report on Decision 235 is the student's response to a question; that response, therefore, was the antecedent of decision 235. The nature of the teacher's decision and her actual response were determined by her expectations for the student's response and her perception that other students in the classroom did not understand the response.

Teacher Originating Antecedents. Teacher originating antecedents are defined as those states of teacher cognition and affect that stimulated the formulation of interactive decisions. Two sub-categories of teacher originating decision antecedents were identified. These are:

1. Teacher Cognitive State
2. Teacher Affective State

1. Teacher Cognitive State. The teacher's state of cognition refers to the teacher's thoughts that acted as stimuli for the formulation of an interactive decision. Statements such as the following are examples of the reported cognitive states that, in part, stimulated the formulation of interactive decisions.

> I couldn't think of a question to ask them.
>
> I was sort of wondering. I was very puzzled at the moment . . .
>
> I couldn't recall who had given the answer "three-sixths."

The following is an example of an interactive decision that was partially stimulated by the teacher's cognitive state.

Decision 224

> T: I sorta felt that I needed the chance to sort of get my thoughts together and, uh, you know, . . . so I . . . I read it out and while I was doing that I was sort of thinking of how I would proceed. . . . and that gave me a chance to sort . . . to think about what I had planned earlier about what to do, sort of thing.

The teacher's cognitive state, although not explicit in this example, is implicitly evident from the explanation, "I sorta felt I needed the chance to sort of get my thoughts together . . ." This state of uncertainty precipitated the formulation of an instructional strategy that enabled her to focus her thoughts upon the lesson plan:

> I read it out and while I was doing that, I was sort of thinking of how I would proceed.

In connection with the next decision, the teacher mentioned two antecedents that led to the formulation of the decision: the first was her curiosity about the meaning of a student's statement (underlined) and the second was her perception of a time constraint (in parentheses).

Decision 57

> T: I was sort of wondering. I was very puzzled at the time but (I knew my time was real short), so I thought, well, I'll just let that go by.

2. Teacher Affective State. The decision antecedents labelled Teacher's Affective State are those emotions or feelings reported by the teacher as having a bearing on her formulation of interactive decisions. For examples:

> I was getting a little tired of all the questions . . .
>
> I sorta got the . . . something said . . . something triggered and I said, "Oh, no, here we go. This is going to be one of those days."
>
> and at that point, you know, I still had, you know, hadn't really . . . emotionally calmed myself down enought that I could sort of think straight and, uh, and, you know, start the questioning.

The following is an example of an interactive decision which was stimulated, in part, by the teacher's affective state (underlined):

> Decision 50
>
> T: Well, the same old story . . . I was mad. I was very cross, because, um, Michael had lost his math book and . . . and I was trying to decide what I was going to do about it, ah, at that point. I thought of some alternatives and thought, "Well, this isn't the time to deal with it", so I sort of left it.

Environmental Antecedents. This class of antecedents consists of events or situations arising in the classroom or school environment that are associated with the teacher's formulation of interactive decisions. Analysis of the data revealed 3 sub-categories of environmental antecedents:

1. Time Constraints
2. Interruption by Another Adult
3. Instructional Material and Equipment

1. Time Constraints. The passage of time was considered to be a decision antecedent when the teacher reported her concern about it and reported that this concern precipitated the formulation of an interactive decision. The following statements are examples of this kind of antecedent:

> I was concerned about the time this morning.
>
> I wanted to provide enough time for those kids who were going over their tests.

I knew my time was real short,

By way of example, we find that Decision 94 was precipitated, in part, by the teacher's perception of time as a constraint. As with many such instances, the antecedent is implicitly stated. In this case the inference to time as a constraint is underlined.

Decision 94

> T: . . . I just brushed him off there and decided that I would go on ahead. Uh, because I couldn't follow his line of thinking and I didn't want to stop for too long.

However, it may be seen that the teacher's confusion as to what the student meant also served as a stimulus for this decision.

2. Interruption by Another Adult. The teacher reported one interactive decision that was stimulated by the interruption of the class by another adult (underlined).

Decision 34

> I: At that point Mr 'X' came in and was speaking with Stan. Can you tell me what thoughts were in your mind at that point?
>
> T: Uh, well I, I guess I was sort of concerned about what, you know, what was going on. . . . Um, I was concerned that it wouldn't go on for too long and it didn't worry me too much. . . . In my own mind I knew that he wouldn't be very long and, if it was a serious problem, that he would try to solve it at another time.

Although no statement of decision was made, the videotape of the interaction showed that the teacher made no move to intervene and, after glancing over to Mr.'X' and Stan, turned her attention to other students.

3. Instructional Material and Equipment. When the teacher reported that her concern with some instructional material or piece of instructional equipment stimulated the formulation of an interactive decision, that concern was labelled a decision antecedent. Such phrases as the following are indicative of this kind of decision antecedent:

> That was my only concern, was the sound (of the television set).
>
> Same old story. No more books left.

In the following example the teacher's interactive instructional decision is obviously in response to a lack of sufficient instructional material (underlined):

> Decision 53
>
> T: That's when I ran out of paper, there. I need some more paper because we were going to have the dictation in the morning. I ran out (of the classroom) very quickly and came back.

Decision Information

The second class of factors that were associated with the formulation of interactive decisions was labelled Decision Information. A piece of decision information or a decision datum is defined as an event, behaviour, or perception that a teacher uses in the formulation of an interactive decision. Analysis of the stimulated recall interview transcripts has indicated that there are 2 prime categories of decision information associated with interactive decisions. These are:

1. Student-Referenced Decision Information
2. Teacher-Referenced Decision Information

Each of the identified categories is defined and illustrated below.

Student-Referenced Decision Information. Student-referenced decision information is defined as that information concerning the student that the teacher reported using in the formulation of an interactive decision. Below are examples of student-referenced data that the teacher reported perceiving during the formulations of interactive decisions.

> I was aware that she'd also been reading a comic or something.
>
> I noticed her and she was . . . just sort of went down in her chair like this . . .
>
> . . . she had lost her sheet and I knew that she didn't have it . . .
>
> I noticed that the kids were giggling and laughing an awful lot.
>
> A lot of them (students) had their hands up . . .
>
> Oh, they seem to be really crowding around . . .

Decision 68 is an example of an interactive decision that was formulated using information concerning student behaviour. The decision datum is underlined.

Decision 68

T: I think that I was trying to catch the title of the story and hoping that it would re-occur. *And I noticed that two girls were talking here*, *Lora and Debbie*, but I sort of ignored it for the moment. It was very quiet.

In the following example, Decision 164, the teacher apparently based her instructional decision on her perceptions of the students' behaviours. The decision data are underlined.

Decision 164

I: Was this something that you had planned previously?

T: No. That . . . that was something that I did. . . . I sorta thought that there might be some confusion, you know, about missing those words. So I just wanted to do some examples. . . . Although I found at the time that everyone seemed to understand after we'd gone through it and I left it at that then.
I: Were you noticing anything particular about the students?

T: Um, Ya. *I noticed that most of them were working*. Like they . . . they'd sort of turned me off already and *they were already working* and *there didn't seem to be anyone who was sort of still looking confused or cued in on me*.

Another type of decision datum used by the teacher in making decisions was the information she reported concerning students' comments, responses to questions, and other verbal behaviours. The following are examples of these reported pieces of information.

> . . . she was relating to something to do with magic or illusion.
>
> . . . when she gave the numbers, she started from the largest and then she went to the smallest . . .
>
> She sort of said, well no, I don't have any opinion.
>
> . . . and he said, "Yes."

Decision 120 was formulated using information about student responses (underlined).

> Decision 120
>
> T: Um, O.K. I was trying to use . . . the kids were giving different words, different things and I was just trying to use their examples that they were coming up with.
>
> I: Um hum.
>
> T: Um, to explain the meaning. Um, I was sort of including everybody in it and the kids were sort of throwing out words and I was trying to pick them up and put them together for everybody, sort of thing, to see if they could understand the idea of the word.

The following is an example of the teacher using her knowledge of previous student behaviours in the formulation of a decision. The decision data are underlined.

> Decision 98
>
> I: Was there any particular reason why you went to Mark?
>
> T: Um, I find that . . . I guess it's something that I've noticed about him a lot. I don't know whether he's not paying attention or he is but he always appears to be off into space, sort of thing. . . . so I asked him .

. . I waited for him to form an answer.

Decision 85 is an example of the teacher using a predictions of student behaviours as a piece of decision data. The data are underlined.

> Decision 85
>
> T: Well, I knew that there was going to be a problem there but I thought, well, I'd just mention it to them and, hopefully, they would pay attention and, uh, just sort of remind them of it.

The following are further examples of her predictions of student behaviours:

> . . . and I didn't think she would come and sit on the floor . . .
>
> . . . I sort of thought they'd stop talking after a minute . . .
>
> I knew someone would bring it up because favour was a word we had on the list a couple of weeks ago.

The following are examples of the teacher using knowledge of her students' home environments as decision data:

> . . . she has lots of family problems at home right now, you know. I believe her family is breaking up right at the moment.
>
> The kids have really a lot of money in this community.
>
> As a matter of fact, she's a new girl that's just moved in. And she doesn't have many friends.
>
> He's had a lot of resource room work and he goes to Saturday classes and summer school . . .

Decision 54 is associated with this kind of information base. The data are underlined.

> Decision 54
>
> I: Why have you decided to ask Lana to share her experiences?
>
> T: Well I know that her father's been over there (Iran) quite a bit this year. As a matter of fact, he's been over there a lot . . . I knew she talked to me about this fact . . . So I knew she had some experiences to give us, because she had talked to me previously, so. . . . well I went and asked her if she would explain what else she knew about that particular topic.

Teacher Referenced Decision Information.

Teacher-referenced decision information is defined as those reported decision data that relate to the teacher's thoughts and feelings concerning the instructional material, her lesson strategies, the estimates or assessments she formed about her students and her lesson strategies.

During the stimulated recall interviews, the teacher reported information relating to her knowledge of herself and the instructional material used in her lessons. Examples of these data are given below:

> Because I have a tendency of doing that, of asking a question and then forgetting about that question and going to someone else.
>
> I have a loud voice and it carries . . .
>
> . . . there was a lot of two and three syllable words in the list.
>
> Well, favour can be spelled either way.

And I didn't know because whether I was dumb or because it didn't make sense to me or what.

I couldn't see any more myself but I didn't know if I'd missed any or not.

In the following example the teacher reported decision data that related to knowledge of her own cognitive functioning. The data are underlined.

Decision 136

T: O.K. I was looking at Tracey and I said Christine. . . . I fouled up their names and I just quickly avoided it . . . continued on.

I: Were you consciously thinking of that at the time, that you chose the wrong names?

T: Ya, I did. Ya, you know, I realized that I had and I was looking at . . . I wanted to ask Tracey and I asked Christine. . . . I realized that I'd made a mistake . . . that's fine. I didn't change it. . . .I do that sometimes, I don't know. I have a mental block some days. . . . you know, I forget about, you know, I'm thinking ahead of myself. . . .I make these silly mistakes.

The following report contains an example of a piece of decision information relating to the teacher's knowledge of the particular instructional material used in this portion of the lesson (underlined).

Decision 171

I: Can you tell me what you were thinking about, then?

T: Um, well, I was trying to get them to give a meaning for that word, contraction--an example . . . I wanted them to know what a contraction was before they started and it (the text) gives several examples so that they know what to do. . . . I was trying to get him to either give me a definition or pick out a word that was a contraction. . . . so I could go from there.

In the discussion of Decision 179, the teacher reported that her interactive decision was based on a certain expectation that she had for the behaviour of students under the prevailing conditions. The underlined data, presented below, indicate that the behaviour did not fit the teacher's exectation:

> Decision 179
>
> T: That's the first time that I've had a student that has offered to answer questions on the first day of school. . . . I find that amazing . . . I couldn't believe it. I saw her hand shoot up, so I thought, well, that's fine, I'll ask her. . . . I don't think at that time I'd made a conscious effort at that time, you know, . . . I hadn't even decided who I was going to ask at that point.

Another focus of information that the teacher reported using in the formulation of her decisions was her strategy preferences. Two different groups of strategy preferences were identified as being pieces of decision information: (a) instructional strategy preferences and (b) managerial strategy preferences. The following are examples of the teacher's instructional strategy preferences:

> I encourage the kids to correct me, if I make a mistake.
>
> . . . if they break it (spelling word) down in their head, they probably can get the spelling right.
>
> . . . I like to be positive . . .

In the following example the underlined instructional strategy preference relates to the teacher's perception of her students' responsibilities.

> Decision 139
>
> I like them to read and I like them to do most of the work . . .
>
> I: Was this something that you had planned to do?
>
> T: Well, I . . . not ahead of time. But I had . . . as I was standing there, I had realized that I had been reading all the sentences (Decision Antecedent). So, I switched and gave the answer rather than having me read.
>
> I: Can you tell me why you decided to do that?
>
> T: Well, I think that at that particular time I had realized that I . . . that I was doing all the reading and doing most of the talking and so I wanted the kids to do more of it. I, you know, I'd sort of forgotten about asking them to do these specific things. I like them to read and like them to do most of the work. So, you know, I realized that I was carrying most of the class along. So I wanted to have them more involved.

The following are examples of the teacher's reported managerial strategy preferences:

> . . . and that sort of draws a focus to the front and I find the kids, you know, draw to the overhead and they're paying attention and they're at least, and I sorta have their attention and that always helps.
>
> . . . and, uh, you know, I sort of feel that I don't have to go running around after them . . .

Assessments of Students. Analysis of the data has resulted in the identification of four distinct groups of decision information that concerned the teacher's estimates or assessments of her students. These groupings are as follows:

1. Assessments of Student Behaviour
2. Assessments of Student Cognition
3. Assessments of Student Affect
4. Assessments of Student Characteristics

1. Assessments of Student Behaviour. The following are examples of the teacher's assessments or inferences of her students' behaviours:

> I noticed that people were listening quite well and, uh, you know, seemed to be ready to make comments about different things.
>
> a lot of them are keenly reading and trying to . . . to get a few books up on their chart.
>
> I don't think that they were doing it on purpose or anything like that, but they just were curious about different things and that.

2. Assessments of Student Cognition. Estimates of the students' learning states frequently focussed upon the teacher's assessments of her students' capabilities of learning. The following are examples of the teacher's assessments of student cognition.

> . . . the whole class was sort of on the idea.
>
> . . . so many of them were lost . . .
>
> . . . I've found that she is quite a good math student.
>
> . . . and he knew that during this time it's quiet time.

3. Assessments of Student Affect. Estimates of students' affective states frequently centred upon the teacher's appraisals of the students' emotional states concurrent with specific events within the classroom, such as students' responses to questions or particular student-teacher interactions. The following are examples of the teacher's estimates of student affect.

> Stan, fortunately, was in a good humour this morning and he took it O.K.
>
> . . . they didn't seem to be too concerned that there was no sentences being given.
>
> And, uh, she was probably just hoping, I think, that she would be ignored. That this would be one of those days that she wouldn't have to worry.
>
> . . . I don't know whether she had the right one or the wrong one or whether she had an answer . . . and she was afraid to give it, for whatever reason.

The contexts in which the teacher formulated her estimates of student affect are as important to examine as the estimates themselves. The following examples display two such interesting occurrences.

Decision 162, formulated during the second spelling lesson, is an example of the teacher basing her estimate of a student's affective state upon (a) her observations of the student's behaviour and (b) her knowledge of the student gained through previous observations. These data are underlined.

Decision 162

T: I didn't think she could hear the 'r' sound, there. See, she . . . . she was saying the word but she wasn't hearing the sound and I wanted to see if she could hear the 'r'. And she . . . *she seemed to be quite flustered*. And, uh, *sort of a little bit nervous* about the fact that I had stopped and, you know, and had directed her on it. . . . Well, *she was embarrassed*. She was red. And she seemed to be very flustered. . . . *So, she was quite upset about it* and so I . . . I didn't want to continue because she gets very upset and very flustered very easily and she says things that she doesn't mean to say and then, you know, she feels badly about it afterwards. So I just gave her the word and then continued on, kept going.

The following example displays the teacher's estimate of the states of mind of many of her students (underlined). The decision was formulated during a question and answer session in the third reading lesson.

Decision 232

O.K. They, you know, *everyone was very excited about it* and sort of . . . finally *I sort of felt that everyone was relaxed*. Uh, you know, and *they were enthusiastic* about answering the question. So I . . . but I still wanted, you know, for Mark to go ahead with what he had to say and just by sort of saying, "O.K. guys, just hang for a second, there", hopefully they would quieten down very quickly . . .

4. Assessments of Student Characteristics. The following are examples of the teacher's estimates of student characteristics. In this context, student characteristics refers to predispositions to certain types of behaviour and/or affect.

But sometimes he . . . if someone had said something like that, he might have become very upset.

. . . her voice is quite quiet, or a very soft voice.

And, uh, she's quite articulate . . .

She's the type of person that is very quiet. She'll sort of make a statement and then she doesn't want to continue on.

Decision 75, a null managerial decision, was formulated using the teacher's assessment of a student's propensity for reading. This assessment is underlined:

Decision 75

T: . . . that was where I noticed that Shawn and Christine were reading. And, uh, I sort of glanced at them and, I think I looked back at them again and I noticed that Christine was sort of paying attention and . . . Shawn is an avid reader. You know, she's the type of person that can sort of sit and digest two things at once, I guess. I didn't worry too much about it. . . . So, I just left it as it was and I didn't say anything.

During the discussion of the formulation of Decision 86, the teacher reported that her assessment of a student's self-concept was a key piece of information used in the formulation of this managerial strategy decision. This information is underlined.

Decision 86

I: Was that a decision there?

T: Uh, ya, she was just sitting there and she was doing absolutely nothing and, uh, I just sorta said, "Well, let's get cracking." Kelly would sit there the whole period without moving. . . . and she's . . . very . . . she just doesn't have any pride in herself or concern about herself.

Teacher Estimates: Lesson. As well as using estimates or assessments of her students as decision data, the teacher also formed and used estimates of her lesson strategies. The following are examples of those estimates.

> and I thought "concentration" was the better word. (teacher estimate of instructional material)
>
> And it (the lesson strategy) wasn't working out very well. (teacher estimate of lesson progress)

In the following example the teacher formulated an instructional decision to use a certain line of questioning. One of the pieces of information that the teacher used in the formulation of this decision was her estimate of the kind of questions she had been asking. The decision datum is underlined.

Decision 117

T: And then I asked him in a trial or in a crime what do we . . . you know, tried to carry it on from there to see if he could associate it. And then, after he had thought about it for a minute then all the lights started blinking and he realized what it was and he said, " Yes" and he was able to come up with it.

I: Were you thinking of developing specific questions during that period?

T: Um, yes. I was trying to think of a situation in which a suspect would be involved. I didn't know if he understood the sentence. It was rather a vague one. I didn't really give a situation, a specific situation. So then I went and discussed the thing in a crime and trial, where does the suspect fit in, sort of thing.

In the formulation of Decision 88, the teacher reported that her estimate of the progress of the lesson was one of the pieces of information used. The data are underlined.

Decision 88

> T: Well, I knew that there was going to be a problem there but I thought, well, I'd just mention it to them and hopefully they would pay attention and, uh, just sort of remind them of it. Um, I suppose that's sort of jumping the gun a little. I suppose I should wait until there's a problem. But, um, with Stan and Tracey together and Michael and Mary, well, that was a good lucrative position for talking. And I wanted to get started. So, again I didn't demand that they move back to their desk and, uh, you know, cause another commotion and get everyone moving again. I thought, well I'll just leave them there and if I have to speak to them, I will. But to . . . to separate them again would have been more of an upheaval and wouldn't have gotten started as quickly as I would have liked.

Quite clearly, the estimate of lesson progress is implicit rather than explicit; it is hidden in the following words: "Well, I knew that there was going to be a problem . . .", "and I wanted to get started . . .", and "But to . . . to separate them again would have been more of an upheaval and wouldn't have gotten started as quickly as I would have liked."

Decision 133 is an example of the teacher's use of information concerning her estimate of a managerial strategy (underlined).

Decision 133

> T: . . . Amanda came up and spoke to me as well. And she wanted to go out of the room and work and I said, "Well, we're going to do it together in class." And she

> was pretty upset about that. . . . I didn't want to talk about it any more because I find that if I pursue something with her, uh, all I've got is a big trouble on my hands. She'll really, you know, throw a tantrum, you know, and she's been known to stomp out of the room and throw her desk over and cause a great commotion. So I certaunly didn't want that to happen over such a little thing. So I thought, well, that's enough. I've said enough and I didn't want to say any more. And then I ignored it and went on.

Again the estimate was implicit, this time being displayed by statements that reflect (a) the teacher's assessment of student affect, "she was pretty upset about that", (b) the teacher's past experience with this student in similar situations, "because I find that if I pursue something with her, uh, all I've got is a big trouble on my hands", and (c) her expectations for the present situation, "So I certainly didn't want that to happen over such a little thing."

During the discussion of the formulation of Decision 143, the teacher reported her estimate of the passage of time as a constraint. These data are underlined.

> Decision 143
>
> T: I sort of felt that they were really excited. . . . They were just . . . crazy. So I said, "Settle down, settle down", sort of thing. . . . And this is the first time that they won, so they just went crazy in the gym. . . . I could sort of hear them talking about, "Oh we're going to give those guys a real rough time at recess time", you know, stuff like this. And so I felt, well, perhaps I should talk about it with them. . . . And I wanted to bring everybody down to earth again, before we got started, even though we were a bit late and I wanted to get going rather quickly. And, as it was, it consumed quite a bit of time.

The behaviours that are reported above did not occur in the classroom, rather they occurred in the gymnasium during the regular physical education class. However, the teacher related the incidence in response to the investigator's comment, "You were a little later returning from the gym today." As the discussion centred around the teacher's decision behaviours, the data collected were considered to be of value to this study, even though they did not refer to behaviours exhibited in the classroom.

Heuristic Techniques Used in Assessment and Estimate Formulation

Two types of heuristics have been considered in this study; representative heuristics and availability heuristics (Kahneman and Tversky, 1972, 1974). As detailed in The Review of the Literature and Relevant Research, representative heuristic is a cognitive technique by which an individual may form an estimate or judgement of an event or perception by comparing pre-conceived characteristics of similar events or perceptions with which he is familiar (Kahneman and Tversky, 1972:431). Similarly, the availability heuristic is a cognitive technique by which the individual may judge or estimate the practicality or effectiveness of a particular action (Kahneman and Tversky, 1974:230).

The presentation of the frequency distributions of the various types of information used in the formulation of the teacher's estimates of her students and classroom strategies is to be found in Table 3. First, in regard to assessments of student behaviour, Table 3 reveals that 43% of all the information used in the formulation of the teacher's assessments of student behaviour was obtained through the teacher's observations of students' behaviours. Estimates of students' states of mind and other characteristics constituted another 37% of the total body of information used in the formulation of assessments of student behaviour. Below are 3 examples of such assessments (underlined).

> . . . people were just not sort of keen on getting started in and everyone was really restless . . . . And, you know, with the accumulation of talking to individual students . . . because I was carrying on a conversation with one individual and it was a very intense conversation and the other kids were either listening . . . or they were busy doing other things or talking in the classroom.

In this first example, the teacher's assessment of student behaviour, "everyone was really restless", was based upon her observations of the behaviours in the classroom (underlined).

> Well, Michael, well, you know, uh, he didn't have his hand up. I'm sure he had something very valid to say and he didn't make a big deal out of it. . . . As it was, he didn't put his hand up to pursue it.

In this second example, Michael's behaviour was estimated to be of little concern, "he didn't make a big

TABLE 3

Distribution of Information Across Teacher Formulated Assessments and Estimates

Teacher Formulated Assessments and Estimates	Categories of Information						
	Observed Student Behaviors	Student Environment	Teacher Self-Knowledge	Knowledge of Instructional Material	Assessments & Estimates of Students	Total Pieces Information	Average Information Per Assessment
Student Behaviour	43% a (72) b *46%* c	3% (5) *56%*	6% (10) *26%*	10% (16) *33%*	38% (63) *34%*	100% (166) *38%*	1.8
Student Cognition	33% (48) *31%*	1% (2) *22%*	12% (17) *43%*	15% (21) *44%*	39% (56) *30%*	100% (144) *33%*	1.7
Student Affect	37% (26) *17%*	1% (1) *11%*	6% (4) *10%*	11% (8) *17%*	45% (32) *17%*	100% (71) *16%*	2.0
Other Student Characteristics	18% (7) *4%*	3% (1) *11%*	8% (3) *8%*	5% (2) *4%*	67% (26) *14%*	100% (39) *9%*	2.1
Lesson Strategies and Progress	18% (3) *2%*	0	24% (5) *13%*	6% (1) *2%*	47% (8) *4%*	100% (17) *4%*	1.1
Totals	36% (156) *100%*	2% (9) *100%*	9% (39) *100%*	11% (48) *100%*	42% (185) *100%*	100% (437)	1.8

a = Row Percentage
b = Absolute Frequency
c = Column Percentage

deal out of it", through the teacher's observation of that behaviour. There does not appear to be any evidence for the statement "I'm sure he had something very valid to say".

> I just sort of felt, that particular time, that they were reading quietly and they were doing something constructive . . . I don't think they were talking or anything. They were just reading. . . . And I noticed that they were paying attention to a certain extent. Now and again they'd just leave their book and watch.

In the third and final example, there does not appear to be any connection between "They were just reading", "they were paying attention to a certain extent" and "they were doing something constructive". There was no evidence in the narration of this estimate formulation that what these students were doing was 'constructive'.

Second, in connection with the teacher's formulation of assessments of student cognition, Table 3 indicates that she used much the same information and in approximately the same proportions as in the formulation of her assessments of student behaviour--33% of the information used in the formulation of these estimates were obtained from observations of students' behaviours. Examples of the teacher's estimates of student cognition are found below (underlined).

> . . . I'm sure he does know what he's doing and what he's saying. . . . Michael is taking Saturday classes and they've been working specifically on fractions and he's been asking me for three months when we're going to be doing fractions.

In this first example, the teacher's estimate of Michael's cognitve state is based upon her perceptions of his behaviour. She has inferred that his taking Saturday classes in Mathematics and his enthusiasm means he has some facility with fractions; hence the estimate, "I'm sure he does know what he's doing and what he's saying."

> I asked Steven that question because . . . I assumed that he was paying attention. . . . I just asked him because the word wasn't a particularly difficult one and I thought he might be able to give an answer for it without too much difficulty . . .

Not stated in this example but elsewhere in the transcripts is the teacher's assessment of Steven as a "slow-learning" student. This assessment was formed partly through the teacher's observations of Steven's performance in the classroom. In this example, the teacher's supposition that Steven would have little difficulty with the question was based upon her estimate of his cognitive abilities and her estimate of the difficulty of the learning material (underlined).

> I asked Mary the first question . . . talked to her first because she was sort of wandering and she didn't seem to be cluing in and . . . . she seemed to be sort of slouched in her desk and not sort of with it and . . . I felt that she's a pretty good student and she would benefit from this . . . because I didn't think frequent was a difficult word for Mary and her ability.

In our third example, the estimate of Mary's cognitive state, "she would benefit from this" , was based upon the teacher's assessment of Mary's ability as a student. The teacher's statement that Mary "seemed to be sort of slouched in her desk and not sort of with it" appears to have little bearing upon her estimate of Mary's cognitive state.

Third, in regards now to the teacher's estimates of student affect, observations of student behaviours once again appear to have constituted the largest single type of information that reportedly formed the basis of the teacher's assessments of students' states of mind. As revealed by Table 3, perceptions of students' characteristics, states of cognition and states of behaviour constituted 44% of the total body of information reported by the teacher during the time she formulated her estimates of students' states of affect. Below are examples of those estimates (underlined).

> Well, she was embarrassed. She was red. And she seemed flustered. She was sort of fidgeting around and she wasn't really concentrating and I noticed that Jennifer kept going back and pointing to the word and she kept looking somewhere else.

In this first example, the teacher's estimate of the student's affective state appears to be based upon her observations of the student's behaviours--"She was sort of fidgeting around", "she kept looking somewhere else"; the student's physical appearance--"She was red."; and her estimate of the student's cognitive state--"she wasn't really concentrating." With these pieces of information, the teacher judged the student to be embarrassed.

> . . . I was still trying to find out where he was getting six from. Be . . . and he was really confused. . . . *(H)e seemed to be really flustered about something*. . . . I wanted to . . . sort of remain patient and go through it as carefully as I could and as slowly as I could. Um, you know, I didn't want him to feel . . . *more uncomfortable* and I just tried to go through it logically and . . . tried not to react to . . . the kids in the class. . . . At one point I did . . . say something. I don't remember what I said. But that sort of cut the laughter, right there.

In this example the teacher estimated the student's affective state to be one of discomfort. The information she reported perceiving during this interchange included (a) her estimate of the student's cognitive state--"he was really confused", (b) her own affective state--"to sort of remain patient", and, (c) the behaviours of other students in the classroom--"that sort of cut the laughter."

In our final example, the teacher's estimate of Naomi's affective state appears to be based upon her observations of Naomi's behaviour--"she moved the book over instantly."

> . . . I said her name and . . . I looked at Naomi when I asked her to move over and *she didn't seem to be upset by the request*, you know, and she moved the book over instantly, you know, sort of thing. Um, so *I didn't think that she was sort of uncomfortable with her*.

Of interest in this example is the fact that this was Naomi's first day in class; she was a new student to that school and classroom. The teacher had no previous interaction with her. Based upon her observations of

4

Naomi's behaviour, then, the teacher judged that Naomi "didn't seem to be upset by that request" and that she wasn't "uncomfortable with her."

Turning now to estimates of other student characteristics, Table 3 reveals that the teacher's estimates of students states of affect, cognition and behaviours constituted the major types of information that were considered during her formulation of estimates of students' characteristics. The following are examples of the teacher's estimates of other student characteristics.

Our first example focusses upon a problem that arose from a student's playing with matches.

> T: . . . I sort of felt that . . . he'd sort of ease the temptation to continue what he was doing, if he wasn't there.
>
> I: Can you explain to me why you felt that if he remained there he might have continued?
>
> T: Well, just sort of for the fact that I know Stan a little bit and, uh, you know, this has happened on several occasions. . .

From her observations of Stan's previous behaviours, the teacher estimated or judged that Stan would not change his behaviour unless he was physically removed from the "temptation" offered by his location in the classroom. Based upon this estimate, the teacher predicted that Stan's behaviour would have continued unless she intervened.

The second example is illustrative of an estimate based on a student's past behaviours.

> . . . I looked up and she was very attentive to what I was doing and she's very quick about such things, you know, finding things in the library. She's very familiar with it. . . . And I knew if she couldn't find it, it was because it was out, sort of thing.

The teacher chose Jennifer to run this errand for her because of her judgement that Jennifer had the ability to find books in the library, " she's very quick about . . . finding things in the library" and of her estimate of Jennifer's state of cognition, "she was very attentive to what I was doing." Not mentioned in this conversation but in another context relating to Jennifer's being asked to run a similar errand, the teacher stated that Jennifer "will have a good look, if, you know, there is a problem or something comes up." It appears, then, that the teacher's estimate of this aspect of Jennifer's character was based upon past observations of Jennifer's behaviours and her assessment of Jennifer's cognitive state.

Our third example of this type of assessment centres on an issue in classroom management (underlined).

> . . . with Stan and Tracey together and Michael and Mary, well, that was . . . a good lucrative position for talking. Well, I knew that there was going to be a problem there. . . . just the fact that I knew the kids them selves and what they were like together and . . . then working in groups before and so om, I know that that combination doesn't work.

In this example, the teacher reported her prediction that the four students would carry-on a conversation if left in their groups. This prediction was based upon her estimate of the characteristic interaction patterns of the students--"I knew the kids themselves and what they were like together" and "I know that that combination doesn't work." By inference, this judgement was formulated using the teacher's perceptions of previous behaviours and her encounters with these students in similar situations.

Moving now to the final column of Table 3 and the teacher's assessments of classroom and teaching strategies, we note that the teacher relied heavily upon her perceptions of students' past behaviours and her judgements of students' states of behaviour and mind. Of the 17 pieces of information dealing with these strategy estimates, 11 focussed upon these perceptions and judgements. An additional 29% of the information reported dealt with reflexive statements of cognition and affect. Below are assessments of reported instructional and managerial strategies.

> T: . . . I was just trying to explain it the way . . . it was explained in the book . . . so that he gets a grasp of what they were trying to get across, so that in the exercises . . . he could understand, . . . you know, the same lines so he wouldn't get them mixed up. Whatever his thoughts were about it, I didn't want him to continue to be confused on the next, on the rest of it. So that's why I . . . tried to explain.
>
> I: Did you think of any other way of explaining this to him?

> T: Um, not at that particular time because I wasn't sure . . . I wasn't sure what he was trying to get at, so I tried to . . . say again what we had already discussed . . .

The particular strategy that the teacher applied in this interaction was based upon her perception of the student's state of cognition, "I didn't want him to continue to be confused . . . on the rest of it", and her own cognitive state, "I wasn't sure what he was trying to get at." There is also evidence that the teacher might have based her assessment of the effectiveness of this strategy upon intuitition, as seen in the statement, "I hadn't thought of another way that I could have done it." Immediately following the implementation of this strategy, the teacher decided to suspend it and move on since, as she stated, "I couldn't follow his line of thinking and I didn't want to stop for too long."

In our second example, we see the teacher relying upon her past experiences with a particular strategy.

> T: I wanted to write them down on the overhead and that sort of draws a focus to the front and I find the kids, you know, draw to the overhead and they're paying attention . . . and that also helps.
>
> I: Were you using any information from the kids at that point to help you with that decision?
>
> T: No, just in the past I've found that it was good to use the overhead that way. . . . I just sort of use it instead of the blackboard. . . . It seems to work better.

Of interest in this example is the lack of information concerning the influence of this strategy upon student learning.

In our third example of strategy assessment, the teacher relies on her perceptions of student behaviour, her perceptions of student cognition, and her prediction of student behaviour (underlined).

> . . . I wanted to get started, so again I didn't demand that they move back to their desks and, uh, you know, cause another commotion and get everybody moving again. . . . (T)o separate them again would have been more of an upheaval and wouldn't have gotten started as quickly as I would have liked. . . . (P)eople were settling down quickly or reasonably quickly and it looked like most people were ready to go, so I didn't want to disturb the class again and start over.

The teacher judged that her intervetion, in this instance, would have created additional disturbance within the classroom.

> Amanda came up and spoke to me as well. And she wanted to go out of the room and work and I said, "Well, we're going to do it together in class." And she was pretty upset about that. . . . I wasn't too concerned about it, because things like this have happened before with Amanda. So I knew what . . . she's like and what she may or may not do. Um, and I didn't want to make a big deal out of it. I didn't want to talk about it anymore, because I find that if I pursue something with her, . . . all I've got is a big trouble on my hands. She'll . . . throw a tantrum, you know, and she's been known to stomp out of the room and throw her desk over and cause a great commotion. So I didn't want that to happen over such a little thing. . . . I won't say anymore because . . . it would be my downfall. . . . (I)f I backtrack or I pursue it further , I thought it would just make it worse.

In our final example, the teacher had decided not to pursue a particular managerial strategy. In this example, the teacher's assessment of effectiveness of that strategy is based upon her perceptions of Amanda's previous behaviours--" things like this have happened before with Amanda"; her prediction that the student would display those behaviours in this situation--" I didn't want that to happen over such a small thing"; and her own affective state--"I wasn't too concerned about it."

Decision Congruence and Feedback

During the stimulated recall interviews, the teacher referred to the intent of her decisions as the purpose of the decision. For example:

> T: I just wanted to draw his attention in and get him going. (from Decision 89)
>
> T: . . . and so I wanted the kids to do more of it . . . and I wanted, you know, them to do the reading.(from Decision 139)
>
> T: . . . and I wanted to see if she could hear the 'r'. (from Decision 161)
>
> T: . . . and sorta get him to quieten down really quickly. (from Decision 212)
>
> T: And, so I was just checking to see if, you know, he had been listening. (from Decision 231)

The decisions that the teacher formulated were judged to be congruent with the stated intent when she either reported or intimated satisfaction with the decision outcomes. Often the teacher did not report that the intent was satisfied but, in the absence of negative comments, her comments were taken to imply congruence. For example:

> T: . . . and so, as I read the question, I just said his name to draw his attention and then I finished reading it. (from Decision 89)
>
> T: . . . so I switched and had them read the sentences and give the answer rather than having me read. (from Decision 139)

At other times the teacher identified the feedback that had caused her to judge a decision to be congruent; for example:

> And she said, "Fine", and, uh, that was the end of it. (from Decision 34)
>
> and then, well I indicated for her to sit down and that's all. And then she sat down. (from Decision 74)
>
> And then I tried to carry on and have him think it through, to see if he could associate it. And he said, "Yes." He was able to come up with it. (from Decision 117)

A decision was judged to be incongruent when the teacher either reported or intimated that the intent of the decision had not been satisfied. More often than not, the teacher did not report the incongruity directly but commented negatively about the results or consequences of her decision.

In many cases decision incongruence prompted the teacher to formulate another decision. For example:

> . . . but I sort of ignored it for the moment. And then I just sort of turned away. . . . They didn't seem to be . . . I sort of thought they'd stop talking after a minute without me having to say something to

> them . . . and they continued talking.
> (from Decision 68)
>
> And I think I just spoke to Debbie. Um, I asked her if she wouldn't mind just watching or being quiet.
> (from Decision 69)

Analysis of the data revealed that the teacher focussed upon two types of decision feedback in judging the congruency of her decisions:

1. Observed Student Behaviour
2. Assessments/Estimates of Students

Observed Student Behaviour. The following example displays an instructional decision that was judged to be congruent through the teacher's perception of students' responses. The feedback data are underlined.

Decision 129

> I: Can you tell me what is happening there?
>
> T: Um, O.K. I was just picking up from everybody and trying to consolidate these different ideas together to make some sense . . . Um, there was a lot of good answers coming in . . . I was sort of concerned because it was the end of the sheet and I was wondering, you know, if people were losing interest or if there were lots of distractions. I noticed that some people were kinda lost . . . they were sort of wandering, you know, away from what we were doing. . . . I noticed that everybody was sort of slightly distracted and this seemed seemed to bring everybody together, back to this point because people were giving answers.

Following the implementation of Decision 135, the teacher judged that the intent of her decision was not satisfied. This incongruence is displayed in the following statement:

> I was looking at Tracey and I said Christine. . . . I fouled up their names. . . . I wanted to ask Tracey and I asked Christine and I . . . . I realized that I'd made a mistake . . .

The feedback received from Tracey, underlined below, persuaded the teacher to continue with this behaviour and have Christine answer the question.

> I didn't change it. I just carried on. . . .
>
> I: Why did you decide to carry on?
>
> T: Um, well I felt dumb. . . . (U)h, I thought Tracey realized what I had done, too, *because she had a smile on her face* because I had eye contact with her and was looking right at her and I think she realized what I had done.

Assessments/Estimates of Students. Following the implementation of Decision 71, the teacher perceived feedback, underlined below, that indicated to her that her decision was incongruent.

> *Decision 71*
>
> I just said his name and hopefully hoping that he'd put it (matches) away . . . and that would be the end of it. *But it wasn't*. . . . (P)revious to this, he caught my eye and put it away and *then he took it out again and continued* . . .

This judgement of decision incongruence resulted in the formulation of a second decision. The feedback perceived from the implementation of this decision was the teacher's estimate of the student's state of mind, underlined below.

Decision 72

> But I just asked him for them (matches) and I said, "Well, sit over here a minute," you know, "until you're sort of ready to go back with the rest of the guys." because he was really bothering them. So, and he was quite willing to sit there . . . so that was fine.

Interactive Decision Rationale

During the stimulated recall interviews the teacher provided statements that were explanations of or reasons for the interactive decisions she formulated. As well as providing explanations and reasons for interactive decisions, these statements also served as the teacher's statements of commitment to her decisions. These explanations and reasons have been labelled decision rationales and three categories of interactive decision rationale statements were identified. These categories are:

1. Teacher Expectation Rationales
2. Teacher Estimate Rationales
3. Self-Referenced Rationales

Each of these categories is defined, illustrated, and discussed below.

Teacher Expectation Rationale Statements. Teacher expectation rationale statements are defined as those statements that focus upon the teacher's expectations for her students and which act as explanations of and reasons for the teacher's formulations of interactive decisions. Three sub-categories of teacher expectation rationale statements were identified during the analysis of the stimulated recall interview data. These sub-categories are:

1. Teacher Expectations for Student Behaviour.
2. Teacher Expectations for Student Affect.
3. Teacher Expectations for Student Cognition.

1. Teacher Expectations for Student Behaviour. The following are examples of this type of rationale:

> I wanted them to read it and do it on their own.
>
> And I'd like him to sort of talk about it as to what things . . . what are his criteria for letting people go . . .

As a further example, in Decision 181 the teacher articulated her expectations of student behaviour as a rationale for the decision.

> Decision 181
>
> I: Can you tell me why you said that?
>
> T: Um, well, I didn't want them to rush and . . . it's a tendency, sort of to skip through these things really quickly . . . I reminded the kids that "ed", "es", and "s" or whatever are suffixes . . .

As may be noticed, the teacher rationalized her decision with the statement:

> I didn't want them to rush . . .

Decision 193 contains a further example of this type of rationale. The teacher had just noticed that a student was not attending to the lesson.

Decision 193

> T: . . . I was just double checking to see if she was sort of with us or not. . . . So I wasn't checking to see if she understood the concept or anything, but I was just sort of bringing her back, you know, with us.

The teacher expected the student to direct her attention to the lesson, as evidenced by the statement, "I was just double checking to see if she was sort of with us or not." The implicit rationale is enclosed in the comment, "I was just . . . bringing her back . . . with us."

2. Teacher Expectations for Student Affect. This sub-category of decision rationales is defined as the teacher's expectations for the affective state of the student, as a consequence of implementation of the interactive decision. The following are examples of these decision rationale statements:

> . . . I'd like them to listen quietly while someone else is speaking, so that they get the idea that what they are saying is worth while.
>
> . . . because I didn't want Stan to get too upset about it . . .
>
> I wanted to encourage him to explain himself . . .
>
> I didn't want to make her feel badly.

The following example is illustrative of an interactive decision that was apparently based, in part at least, on the teacher's expectations for the student's emotional state.

Decision 206

> T: I still couldn't understand what his . . . why he was going on to six . . . so I did it again just . . . just to make sure. . . . I didn't want him to feel uncomfortable. . . . So I just tried to go through it logically.

3. Teacher Expectations for Student Cognition. Statements such as those below are examples of the teacher's expectations for her students' states of cognition or understanding of the material being presented during the lesson.

> I do try and get the kids to listen to one another and, you know, to make judgements or to draw some conclusions or something from what other kids are saying . . .
>
> . . . if I got them to relate some experiences or some things that they'd seen in television or books that they've read . . . then it was easier to answer the question . . .
>
> I'd like her to try to see if she can work it out on her own.

Decision 78 is an example of an interactive decision for which the teacher produced a rationale statement that focussed upon her expectation for her students' states of cognition.

Decision 78

> T: I usually say that . . . just to remind them that if they're having troubles with more than two or three, you

> know, with a two or more syllable word, if they break it down in their head, they probably can get the spelling right.

In this example there is an additional rationale statement, namely: "I usually say that . . .". In addition, the teacher had an expectation that her students would forget the technique of handling the spelling of words, that they had been taught at an earlier time. This expectation was one of the reasons for choosing the particular decision action evident in Decision 78.

In the discussion of Decision 85, the teacher revealed an implicit expectation for a student's state of cognition. Of interest are the other statements of rationale and pieces of information that the teacher provided in the recounting of the formulation of this decision.

> Decision 85
> T: . . . she was just sitting there and she was doing absolutely nothing and, uh, I just sorta said, "Well, let's get cracking." Kelly will sit there the whole period without moving. And she's very un . . . she just doesn't have any pride in herself or . . . or concern about herself. . . . And, uh, I must admit that at times I just neglect her because I'm just tired of asking her over and over again to do it, . . . But today we were starting a new section and I thought, "Well, you know, I think she'd better try to get in on this. At least pick up a few things, if anything."

Teacher Assessment Rationale Statements. Often, in rationalizing or explaining the formulation of an interactive decision, the teacher provided an assessment or an estimate. These concerned:

1. Student Behaviour.
2. Student Cognition.
3. Student Affect.
4. Instructional Material.
5. Instructional Strategies.
6. Managerial Strategies.
7. Lesson Pacing.

Teacher assessment rational statements are distinguished from teacher expectation rationale statements. The teacher's assessment rationale statements refer to her evaluations or hypotheses of an event or behaviour. On the other hand, the teacher's expectation rationale statements refer to the desired outcomes of an event or behaviour. The following rationale statements demonstrate the difference:

> I still would like him to be there and be part of the class . . .
>
> I felt that he would take advantage . . . and would get very mad and would just continue to disrupt.

In the first statement, the teacher wants the student to behave in a certain manner. In the second statement, on the other hand, the teacher expresses her assessment of the possibility that a certain type of student behaviour would occur.

1. Assessments of Student Behaviour. The teacher provided rationale statements that focussed upon her assessments of student behaviour. The following underlined statements display these decision rationales.

> . . . because they were working together quietly or they were sitting there quietly and *they were waiting to get started* . . .
>
> I was trying to decide if *they were sincere or not*. (The students were clapping following another student's response.)
>
> . . . because *there were a few kids who had something that they wanted to say*.
>
> They didn't seem to be . . . I sort of thought *they'd stop talking* after a minute without me having to say something to them.

In the following example the teacher assessed a student's behaviour and the possibility of it continuing (underlined). As a result, she decided to stop his current behaviour and have him change it.

> *Decision 90*
>
> T: . . . *he was kinda distracting* the people who were off in that particular corner. . . . So, I thought, well, I'd better say something now *before it sort of builds up and continues on* and *then I have a problem*.

Not only did the teacher assess the behaviour of the student to be disruptive but she also estimated an increase in disruptive behaviour, should she allow the behaviour to continue.

When the teacher discussed the formulation of Decision

151, she used the phrase: "because I knew who was involved." That phrase indicated her estimate that the students would behave in a particular manner. That estimate was the reason she cited for permitting certain students to become involved in their choice of unstructured activity.

> Decision 151
>
> T: I usually let the kids have a free time, if they've got a hundred per cent and, uh, it's sort of up to them to do what they like to with their time. . . . So I was just sort of offering a suggestion, you know. If they wanted to go, that was fine or they could stay in the classroom. It didn't matter to me, because I knew who was involved.

2. Teacher Assessments of Student Cognition. The teacher provided rationale statements that focussed upon her assessments of her students' states of cognition, as explanations for her formulation of interactive decisions. Such statements as the following demonstrate this decision rationale.

> . . . she can hear quite well from where she was.
>
> I thought that some of them may have been lost in the conversation.
>
> . . . since everyone is so close . . . sitting together at the front, when someone talks or whenever others are listening, it's hard to hear there.
>
> . . . it might be a little easier for the other kids to watch.

The following example displays the teacher's assessment of a student's state of cognition (underlined).

Decision 92

> T: I didn't understand what he was trying to get at, at all. . . . But, um, I'm very confused as to what he was trying to get across. He may very well have been right but I don't know. So, um, you know, I didn't . . . want him to continue too long with this line of thought because I was concerned that . . . some of the other kids might . . . would become confused by it . . .

In this dialogue the teacher's estimate of her students' states of cognition is to be found in the statement: ". . . because I was concerned that . . . some of the other kids might . . . become confused by it." This was the explanation or rationale provided for the formulation of Decision 92.

In the formulation of Decision 134, the teacher judged that the students had not understood her instructions.

Decision 134

> T: I said that again because I felt that the kids weren't sure. They were still fumbling around and trying to find the right page. So I just restated it again and waited for a minute.
>
> I: Was this a conscious choice?
>
> T: . . . Ya, I would say so. Because I probably wouldn't have said anything, if everybody had just, you know, uh, seemed to be ready to go, sort of thing . . .

The rationales for Decision 134 are contained in the statements: "because I felt that the kids weren't sure" and ". . . I probably wouldn't have said anything, if everybody had just . . . seemed to be ready to go."

3. Teacher Assessments of Student Affect. The teacher provided rationale statements that focussed upon her estimates of her students' affective states. These estimates of students' affective states refer only to what the teacher believed the students were feeling or might feel. The following are examples of such rationale statements.

> I didn't want to push her too much and make her feel bad. . .
>
> . . . it was a real drag for him to sit there . . .
>
> Because she seemed to be unsure of herself . . .
>
> I wasn't going to make him feel bad . . .

Decision 162 is an example of a decision not to pursue an instructional point with a student. The teacher explained that she discontinued her strategy because she estimated that the consquences of continuing would have increased the student's embarrassment.

> Decision 162
>
> T: Well, she was embarrassed. . . . So she was quite upset about it and, so, I . . . didn't want to continue on because she gets very upset and very flustered very easily and she says things that she doesn't mean to say and then, you know, she feels badly about it afterwards. So, I just gave her the word and then continued on . . .

Similarly, in the formulation of Decision 211, the teacher's focus was on the student's emotional state. Her decision to discontinue her strategy was based upon her estimate of the student's emotional reaction to her continuing. In this case, the teacher was unable to form a definite estimate but made a judgement with the information she had.

Decision 211

> T: At that point, I felt that . . . there had been enough and, uh, you know, I was concerned about Mark's feelings. I didn't know whether he would be . . . how upset he would become by it. So I felt that I would just say that and then just continue on and not say anymore . . .

4. Teacher Assessments of Instructional Material. The teacher provided rationale statements that focussed upon her judgements of the value of instructional material as explanations for the formulation of interactive decisions. Examples of these statements are:

> Because he needed his math book.
>
> I didn't think it was a particularly difficult question for him to answer.

5. Teacher Assessments of Instructional Strategies. The teacher reported rationale statements that concentrate upon her assessments of the instructional strategies employed as explanations for those decisions. Examples of those statements are:

> so I thought it would be very difficult to ask another question and continue on having everyone's attention
>
> I didn't think it would do me any good to pursue it, you know, the questioning.

6. Teacher Assessments of Managerial Strategies. The teacher provided rationale statements that centred upon her estimates of the managerial strategies employed as explanations for her managerial decisions. Examples of these rationale statements are:

> I didn't demand that they move back to their desk and . . . cause another commotion and get everyone moving again. I thought, well I'll just leave them there and if I have to speak to them, well I will.
>
> But I will be constantly interrupted, if I don't say something.

7. Teacher Assessments of Lesson Pacing. Finally, the teacher reported rationale statements that focussed upon her assessments of the pace of the lessons. Examples of these decision rationales are:

> and I wanted to keep going . . .
>
> I didn't want to stall for anymore time or drag it on any further.
>
> So I was sort of trying to keep it going . . .
>
> But I wanted to get started on it and keep going.

As an explanation for the instructional strategy formulated in Decision 92, the teacher mentioned the pressure she was feeling to move the lesson along and not to stop.

> Decision 92
>
> T: So I said, "O.K., Michael, we'll just leave it as it stands for now." . . . So, um, you know, I didn't . . . want him to continue too long with this line of thought.

> . . . I sorta brushed him off, really, and I didn't really go into it in depth. . . . I guess I felt pressured and I wanted to get going, so I didn't stop. I just wanted to get ahead.

In her discussion of the formulation of Decision 131, a managerial decision, the teacher provided the following explanation:

> Decision 131
>
> But I still didn't want to break the momentum. Because we'd just finished marking the one sheet and I wanted to continue on with it without stopping.

As is evident in this example, the pace of the lesson was the prime reason for the formulation of this decision not to break the momentum by focussing upon a particular student.

Self-Referenced Rationale. This category of decision rationale refers to explanations that the teacher provided for her interactive decisions that were self-focussed or self-referenced. The following sub-categories of self-referenced decision rationale statements were identified:

1. Instructional Strategy Preferences
2. Managerial Strategy Preferences
3. Established Routines
4. Teacher State of Cognition
5. Intuition
6. No Rationale Reported

1. Instructional Strategy Preferences. The teacher reported formulating several interactive instructional decisions based upon her preferences for particular instructional strategies. For example, in a decision not to give the students more words for their reading vocabulary, the teacher provided the following rationale statement:

> . . . I just like to give the words from the glossary.

Other examples of instructional strategy preference rationale statements are:

> I like the kids to sort of discuss it, talk about it.
>
> I try to get around to everybody. . . . But I try to go in order.
>
> I don't like to particularly stay with one person for a great length of time. I like to get around to as many as I can.

In the following account, the teacher explained her reason for a particular response to a student's question. The rationale statement is underlined.

> Decision 146
>
> T: She asked me if I'd glance at it and see if it looked o.k. And then she said she would continue on with the rest of it . . . if it was alright. And I said fine. I wouldn't say no, it wasn't any good. I would never say that. I would say, "That's fine. You go ahead and finish off whatever line you . . . whatever you want to do."

Another instructional strategy preference that the teacher cited as a decision rationale was her preference for quiet before she read or dictated words to the students. This is evidenced in the statement of the formulation of Decision 164, a desist decision using a verbal signal.

> *Decision 164*
>
> T: I think Stan and Mary might have been talking together and, uh, when I go over the words in a dictation, I really like it to be quiet, because I find that when someone else is talking, then the other kids might not be able to pick up what I said and misunderstand or something. So, when I re-read, I want them to be very quiet and, you know, I just . . . just said his name and said, "O.k., just hang tough here for a second until we get finished."

2. Managerial Strategy Preferences. During the discussion of the formulation of interactive managerial decisions, the teacher also provided managerial strategy preferences as rationale. One of her managerial strategy preferences was to ignore behaviour that she did not perceive as being potentially disruptive.

> *It wasn't*, ah, you know, *really important enough to pursue*, I didn't think, *to make a big deal out of it*, kind of thing.

Furthermore, the teacher sometimes employed instructional strategies to manage student behaviours. In the following example, the decision to use an instructional directive (in parentheses) is rationalized in terms of student behaviour management (underlined).

> (But if I gave an instruction) then *it would help*, you know, *the people who were ready would quickly settle down* and *those people wouldn't be talking*, *so the room would become quieter and maybe it would encourage the*

> other kids to settle down quickly and get their work out.

At first glance, the data contained in the above example, "But if I gave an instruction", appears to be non-coded non-interactive. However, in the context of the entire discussion--which is too long to record here--the data refers to a behaviour that was implemented in an interactive decision moment.

Rather than desisting behaviour using verbal signals, the teacher sometimes preferred to focus on a student's response; such a managerial preference rationale was observed in the teacher's discussion of the formulation of Decision 13:

> Decision 13
>
> T: Everyone was kinda talking out of turn. And, um, I didn't want them to do that. But I didn't want to specifically come out and say, "Well, O.K., let's be quiet." So I cued in on one person and tried to go from that person so that everyone would listen and then carry the conversation from person to person.

3. Established Routines. Established routines or habitual behaviours were also cited as rationales for interactive decisions. The following examples are evidence of this type of decision rationale.

> I: Why did you decide to read first?
>
> T: I usually do that. I usually start the story off.
>
> I was trying to make sure that I was getting everybody

> but not her specifically. . . . Ya, because I try to do that. . . . This is something I've always done.

> and I just made a quick check of the room. . . . That's sort of a habit that I do. Something that I usually do.

4. Teacher Cognitive States. The term "Teacher Cognitive States" refers to a decision rationale statement that concerns thoughts other than about her students or the lesson. For example, during the discussion of Decision 14, the teacher referred to her inability to create a question that would have helped the students discover a particular word. The intent of the teacher's behaviour (in parentheses) was not operationalized, due to her inability to formulate the question she wanted. As a result of this cognitive lapse (underlined), the teacher made a decision to supply the word to the students.

> Decision 14
>
> T: (I wanted them to come up with the word "concentration") because they had "control" there. . . . So they were on the right track and I wanted them to keep thinking along that line . . . (so I was trying to formulate my questions so that I could get them to get that particular word that I wanted) . . . but I went ahead anyway and gave it to them.
>
> I: Was there any particular reason why you decided to that?
>
> T: Ya, because I couldn't think of a question to ask them. I couldn't formulate a question in my mind . . . fast enough to think of anything that I could say that would get them to come across with this particular word.

In response to a question regarding the reasons for a particular questioning strategy, the teacher replied, "O.K., well I'd like to know how the kids feel about it and what their opinions are." And, in her discussion of a decision to implement a particular instructional strategy, the teacher reported her inability to recall a student's response (underlined) as the reason for returning to the example presented in an earlier response.

Decision 105

I couldn't recall who had given the answer "three-sixths". So I wanted to know who it was so that I could associate that person's name with the answer and then go on and ask someone to explain the relationship . . . .

5. Intuition. The teacher reported one decision that was formulated as a result of her intuition. The following is the teacher's account of the formulation of that decision and the intuitive thought (underlined) that served as the rationale.

Decision 20

I: Why did you choose that sentence?

T: I thought that would probably be the easiest way to put it across. Um, I don't really know why in particular . . . . other than that they just seemed to come to mind. It just seemed to sum up what she was trying to say. At least I sort of felt that in my mind it was, anyway.

6. No Rationale Reported. Three instances of decision formulation were reported for which the teacher could provide no rationale.

Global Patterns and Trends

Overview

This section reports global patterns and trends that were identified by noting phenomena that were frequently associated with the teacher's interactive decisions. In brief, these relate to:

1. The incidence of teacher interactive decision making.
2. The types of decision antecedents to which the teacher most attended.
3. The types of information that the teacher used most often.
4. The number of alternatives consciously considered during the formulation of interactive decisions.
5. The types of feedback information that the teacher most frequently encountered or reported following the implementation of her interactive decisions.
6. The types explanations or rationales that the teacher most often provided for the interactive decisions she formulated.
7. The incidence of decision congruence.

This Section is organized accordingly.

Incidence of Interactive Decisions

The frequency distributions of interactive decisions are presented in Tables 4 through 6. These distributions are examined in terms of row numbers, percentages, and averages, and by sub-categories and lesson types.

Table 4 reveals that the teacher formulated both instructional and managerial decisions in each of the lessons observed. Furthermore, it indicates that twice as many (164) interactive instructional decisions were reportedly formulated than were interactive managerial decisions (78). The largest number of interactive instructional decisions occurred during the second mathematics lesson and the second reading lesson (n=23), while the lowest number reported occurred during the first reading lesson (n=7). The largest number of interactive managerial decisions occurred during the third mathematics lesson (n=13), the third reading lesson (n=12), and the group discussion (n=12), while the lowest number occurred during the language arts lesson (n=5) and the second reading lesson (n=5).

Table 5, focussing on the incidence of instructional decisions, reveals that the largest numbers of reported instructional strategy decisions was formulated during the second and third mathematics lessons (n=14 and 16),

TABLE 4

DISTRIBUTIONS OF INTERACTIVE DECISIONS ACROSS OBSERVED LESSONS

Prime Categories of Interactive Decisions	Distribution Across Mathematics Lessons					Distribution Across Reading Lessons					Distribution Across Spelling Lessons				Distribution Across Group Discussion Lessons	Distribution Across Language Arts Lessons	Distribution Across All Lessons
	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Total	Average Per Lesson			
Instructional Decisions	7% a (12) b 60% c	14% (23) 79%	12% (20) 61%	33% (55) 67%	18	4% (7) 47%	14% (23) 82%	10% (17) 59%	29% (47) 64%	16	11% (18) 64%	6% (10) 59%	17% (28) 62%	14	12% (19) 79%	9% (15) 83%	100% (164) 68%
Managerial Decisions	10% a (8) b 40% c	8% (6) 21%	17% (13) 39%	35% (27) 33%	9	10% (8) 53%	6% (5) 18%	15% (12) 41%	33% (26) 36%	8	13% (10) 36%	9% (7) 41%	22% (17) 38%	8	6% (12) 21%	4% (3) 17%	100% (78) 32%
Total Decisions	9% a (20) b 100% c	12% (29) 100%	14% (33) 100%	34% (82) 100%	27	6% (15) 100%	12% (28) 100%	12% (29) 100%	30% (73) 100%	24	12% (28) 100%	7% (17) 100%	19% (45) 100%	22	10% (24) 100%	7% (18) 100%	100% (242) 100%

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 5

DISTRIBUTIONS OF INTERACTIVE INSTRUCTIONAL DECISIONS ACROSS OBSERVED LESSONS

Categories of Interactive Instructional Decisions	Distribution Across Mathematics Lessons					Distribution Across Reading Lessons					Distribution Across Spelling Lessons				Distribution Across Group Discussion Lessons	Distribution Across Language Arts Lessons	Distribution Across All Lessons
	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Total	Average Per Lesson			
Strategy Decisions	9% a (11)b *92% c*	11% (14) *61%*	13% (16) *80%*	34% (41) *74%*	14	6% (7) *100%*	11% (14) *61%*	11% (13) *76%*	28% (34) *72%*	11	11% (13) *72%*	7% (9) *90%*	18% (22) *79%*	11	11% (14) *74%*	9% (11) *73%*	100% (122) *74%*
Student Questioning Decisions	0	30% (8) *38%*	7% (2) *10%*	37% (10) *18%*	3	0	26% (7) *30%*	7% (2) *12%*	33% (9) *19%*	3	4% (1) *6%*	0	4% (1) *4%*	.5	11% (3) *16%*	15% (4) *27%*	100% (27) *16%*
Null Decisions	14% (1) *8%*	14% (1) *4%*	0	28% (2) *4%*	0.7	0	14% (1) *4%*	14% (1) *6%*	28% (2) *4%*	.7	14% (1) *6%*	14% (1) *10%*	28% (2) *7%*	1	14% (1) *5%*	100% 0	100% (7) *4%*
Planning Decisions	0	0	25% (2) *10%*	25% 2 *4%*	0.7	0	12% (1) *4%*	12% (1) *6%*	25% (2) *4%*	.7	38% (3) *17%*	0	38% (3) *11%*	1.5	12% (1) *5%*	0	100% (8) *5%*
Total Decisions	7% (12) *100%*	14% (23) *100%*	12% (20) *100%*	33% (55) *100%*	18	4% (7) *100%*	14% (23) *100%*	10% (17) *100%*	29% (47) *100%*	15	11% (18) *100%*	6% (10) *100%*	17% (28) *100%*	14	12% (19) *100%*	9% (15) *100%*	100% (164)

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

the second and third reading lessons (n=14 and 13), the first spelling lesson (n=13), and the group discussion (n=14). The lowest incidences of this kind of decision were associated with the first reading lesson (n=7) and the second spelling lesson (n=9). On the average, 14 instructional strategy decisions were formulated in each mathematics lesson, 11 in each reading lesson, and 11 in each spelling lesson.

A large number of student questioning decisions reportedly occurred in the second mathematics lesson and the second reading lesson; 15 of the 27 decisions to ask questions of specific students occurred during these two lessons.

Reported null instructional decisions were fairly evenly distributed across all lessons. The only lessons in which null instructional decisions were not formulated were the third mathematics lesson, the first reading lesson, and the language arts lesson.

There were 8 planning decisions formulated. Of these, more than half occurred during the third mathematics lesson and the first spelling lesson.

Table 6 summarizes the frequencies with which managerial decisions occurred and reveals that the teacher formulated this kind of interactive decision in each of the lessons observed. However, more interactive managerial

TABLE 6

DISTRIBUTIONS OF INTERACTIVE MANAGERIAL DECISIONS ACROSS OBSERVED LESSONS

Frequency and Percentage Distributions By Observed Lessons

Categories of Interactive Managerial Decisions	Distributions Across Mathematics Lessons					Distributions Across Reading Lessons					Distributions Across Spelling Lessons				Distributions Across Discussion Lesson	Distributions Across Language Arts Lesson	Distribution Across All Lessons
	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Lesson Three	Total	Average Per Lesson	Lesson One	Lesson Two	Total	Average Per Lesson			
Strategy Decisions	10% a (5)b *62%* c	10% (5) *83%*	14% (7) *54%*	34% (17) *63%*	6	10% (5) *62%*	10% (5) *100%*	18% (9) *69%*	38% (19) *73%*	6	2% (1) *33%*	10% (5) *71%*	12% (6) *60%*	3	16% (8) *67%*	0	100% (50) *64%*
Desist Decisions	0	0	32% (6) *46%*	32% (6) *22%*	2	8% (2) *25%*	0	21% (4) *31%*	32% (6) *23%*	2	5% (1) *33%*	5% (1) *14%*	10% (2) *20%*	1	16% (3) *25%*	10% (2) *67%*	100% (19) *24%*
Null Decisions	33% (3) *37%*	11% (1) *17%*	0	44% (4) *15%*	1.3	11% (1) *12%*	0	0	11% (1) *4%*	.3	11% (1) *33%*	11% (1) *14%*	22% (2) *20%*	1	11% (1) *8%*	11% (1) *33%*	100% (9) *12%*
Total Decisions	10% (8) *100%*	8% (6) *100%*	17% (13) *100%*	35% (27) *100%*	9	10% (8) *100%*	6% (5) *100%*	17% (13) *100%*	32% (26) *100%*	8	4% (3) *100%*	9% (7) *100%*	13% (10) *100%*	5	15% (12) *100%*	4% (3) *100%*	100% (78) *100%*

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

decisions were made during the third mathematics and the third reading lessons (n= 7 and 9) than in any of the other observed lessons. The smallest numbers of interactive managerial decisions were formulated during the first spelling and the language arts lessons (n=3).

Table 6 also reveals that the teacher made no managerial strategy decisions during the language arts lesson. The largest numbers of this type of decision (n=9 and 8) occurred during the third reading lesson and the group discussion.

The majority of desist decisions was formulated over the third mathematics lesson (n=6) and the third reading lesson (n=4). No desist decisions were reported for the first two mathematics lessons and the second reading lesson.

One third of the reported null managerial decisions (n=3) occurred during the first mathematics lesson. The remainder were fairly evenly distributed across the other lesson groups.

Of the 242 interactive decisions formulated, more were to be found, on average, in each of the mathematics, reading and group discussion lessons. Of interest also is the ratio of instructional decision formulated to managerial decision formulated. This ratio is 2:1 for mathematics and reading lessons; however, it increases during the spelling and group discussion lessons and decreases during the language arts lesson. The ratio of instructional decision formulated to managerial decision for the spelling lessons is 1.7:1 and for the group discussion is 1.6:1, while for the language arts lesson, the ratio is 5:1.

Frequency Distributions of Decision Antecedents

The incidences of decision antecedents that are associated with the various types of interactive decisions are presented in Tables 7 through 9. These frequency distributions are displayed in row numbers, percentages, and averages, and by sub-categories of antecedents and interactive decisions.

Table 7 reveals that the teacher reported 336 stimuli that generated within her the need to formulate the 242 interactive decisions that were identified. Of these 336 decision antecedents, 205 triggered 164 interactive instructional decisions and 131 stimulated the formulation of 78 interactive managerial decisions. Ninety-four (46%) of the 205 antecedents that stimulated the interactive instructional decisions originated with the students, while this same category of antecedent accounts for 54% of all the antecedents that were associated with interactive managerial decisions.

Table 7 also reveals that 73 (36%) of the reported antecedents that were associated with instructional decisions were environmental antecedents. Environmental

TABLE 7

DISTRIBUTIONS OF ANTECEDENTS ACROSS INTERACTIVE DECISIONS

Categories of Interactive Decisions	Antecedents			Totals	Average Antecedents Per Decision
	Student Originating	Teacher Originating	Environmental Originating		
Instructional Decisions (n=164)	46% a (94)b *57% c*	18% (38) *69%*	36% (73) *63%*	100% (205) *61%*	1
Managerial Decisions (n=78)	54% (71) *43%*	13% (17) *31%*	33% (43) *37%*	100% (131) *39%*	2
Totals (n=242)	49% (165) *100%*	16% (55) *100%*	35% (116) *100%*	100% (336) *100%*	1.4

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

antecedents also constituted the second largest group of managerial decision antecedents.

Table 8 provides a summary of the frequencies with which antecedents were associated with various types of interactive instructional decisions. Relatively speaking (see column 5), the teacher responded to more antecedents in the case of with null instructional decisions than in the case of any other sub-category of instructional decision. The smallest proportion of antecedents was associated with the formulation of instructional strategy decisions. Once again, student originating antecedents formed the largest group of reported decision antecedents for each of the sub-categories of interactive instructional decisions, with the exception of interactive planning decisions. In the case of planning decisions, student originating and teacher originating antecdents were equal in number.

Table 9 provides a summary of the incidence of the categories of antecedents that are associated with the various types of managerial decisions and reveals that relatively more antecedents stimulated the formulation of each interactive desist decision than the formulation of other sub-categories of interactive managerial decisions. The teacher responded to the least number of antecedents in the formulation of each managerial strategy decision. As with instructional decisions, student originating

TABLE 8

DISTRIBUTIONS OF ANTECEDENTS ACROSS INTERACTIVE INSTRUCTIONAL DECISIONS

Categories of Instructional Decisions	Antecedents			All Categories of Antecedents	Average Antecedents Per Decision
	Student Originating	Teacher Originating	Environmental Originating		
Strategy Decisions (n=122)	45% a (65) b *69%* c	19% (28) *74%*	36% (52) *71%*	100% (145) *71%*	1.2
Student Questioning Decisions (n=27)	49% (18) *19%*	8% (3) *8%*	43% (16) *22%*	100% (37) *18%*	1.4
Null Decisions (n=7)	54% (7) *7%*	23% (3) *8%*	23% (3) *4%*	100% (13) *6%*	1.9
Planning Decisions (n=8)	40% (4) *4%*	40% (4) *10%*	20% (2) *3%*	100% (10) *5%*	1.2
Totals (n=164)	46% (94) *100%*	18% (38) *100%*	36% (73) *100%*	100% (205) *100%*	1.3

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 9

DISTRIBUTIONS OF ANTECEDENTS ACROSS INTERACTIVE MANAGERIAL DECISIONS

Categories of Interactive Managerial Decisions	Antecedents			All Categories of Antecedents	Average Antecedents Per Decision
	Student Originating	Teacher Originating	Environmental Originating		
Strategy Decisions (n=50)	55% a (42) b 59% c	13% (10) 59%	32% (24) 56%	100% (76) 58%	1.5
Desist Decisions (n=19)	56% (22) 31%	8% (3) 18%	39% (14) 32%	100% (39) 30%	2
Null Decisions (n=9)	44% (7) 10%	25% (4) 23%	31% (5) 17%	(16) 12%	1.8
Totals (n=78)	54% (71) 100%	13% (17) 100%	33% (43) 100%	100% (131) 100%	1.7

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

antecedents accounted for the largest group of reported decision antecedents for each of the sub-categories of interactive managerial decisions.

Decision Information

Tables 10 through 12 present the incidences of various categories of information that were associated with the formulation of interactive decisions. These frequency distributions are arrayed in terms of row numbers, percentages, and averages, and information types associated with categories of interactive instructional and managerial decisions.

Table 10 examines the incidence of decision information and reveals that, in relation to the 242 interactive decisions examined, the teacher reported perceiving 515 pieces of information. Of these decision data, 376 were distributed across three categories, labelled: (a) "Observed Student Behaviours", (b) "Teacher Assessment - Students", and (c) "Teacher Assessment - Lesson Strategies and Progress".

The largest group of decision data was classified as the teacher's assessments of student characteristics and lesson strategies and accounted for 53% of all instructional decision information and 31% of managerial decision data. The second largest group of decision information was classified as observed student behaviours and comprised 140

TABLE 10

DISTRIBUTIONS OF INFORMATION ACROSS INTERACTIVE DECISIONS

Prime Categories of Interactive Decisions	Information								
	Observed Student Behaviour	Previously Observed Student Behaviour	Student Environment	Teacher Knowledge of Self and Instructional Material	Strategy Preference	Teacher Assessments - Students	Teacher Assessments - Lesson Strategies and Progress	All Categories of Information	Average Information Per Decision
Instructional Decisions (n=164)	17% a (60)b *53% c*	7% (27) *100%*	1% (4) *100%*	18% (66) *65%*	3% (12) *40%*	50% (181) *85%*	3% (11) *41%*	100% (361)	2.2
Managerial Decisions (n=78)	34% (53) *47%*	0	0	23% (35) *35%*	12% (18) *60%*	21% (32) *15%*	10% (16) *59%*	100% (154)	2.0
Total Decisions (n=242)	22% (113) *100%*	5% (27) *100%*	1% (4) *100%*	20% (101) *100%*	6% (30) *100%*	41% (213) *100%*	5% (27) *100%*	100% (515) *100%*	2.1

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

pieces of decision data. It appears that relatively greater numbers of these observations were used in the formulation of interactive managerial decisions than in connection with instructional decisions.

Table 11 focusses on the frequency with which the various types of decision information were used in the formulation of instructional decisions. In the formulation of each of the four types of instructional decisions, the teacher's estimates of the students' states of mind, behaviour, and other characteristics constituted the largest proportion of the total data. For example, of the 276 pieces of decision information used in the formulation of instructional strategy decisions, 51% consisted of the teacher's estimates of her students.

Table 12 examines the frequency with which the various types of information were used in the formulation of managerial decisions. In contrast to the formulation of instructional decisions, observations of student behaviour formed the largest proportion of the total body of decision data used in the formulation of managerial decisions; 53 pieces of information (34%) were observations of student behaviour while 31% of the total body of information used in the formulation of managerial decisions were the teacher's assessments of her students and of the lesson and its progress. Of interest is the observation that the teacher

TABLE 11

DISTRIBUTION OF INFORMATION ACROSS INTERACTIVE INSTRUCTIONAL DECISIONS

Categories of Instructional Decisions	Information								
	Observed Student Behaviours	Previously Observed Student Behaviours	Student Environment	Teacher Knowledge of Self and Instructional Material	Strategy Preference	Teacher Assessments - Students	Teacher Assessments - Lesson Strategies and Progress	All Categories of Information	Average Information Per Decision
Strategy Decisions (n=122)	18% a (50) b 83% c	7% (20) 74%	1% (3) 75%	16% (45) 68%	3% (9) 75%	52% (142) 78%	3% (7) 64%	100% (276) 77%	2.3
Student Questioning Decisions (n=27)	15% (8) 13%	10% (5) 18%	2% (1) 25%	13% (7) 11%	4% (2) 17%	56% (29) 16%	0	100% (52) 14%	1.9
Null Decisions (n=7)	5% (1) 2%	0	0	47% (9) 14%	5% (1) 8%	26% (5) 3%	16% (3) 27%	100% (19) 5%	2.7
Planning Decisions (n=8)	7% (1) 2%	14% (2) 7%	0	36% (5) 7%	0	36% (5) 3%	7% (1) 9%	100% (14) 4%	1.7
Totals (n=164)	17% (60) 100%	7% (27) 100%	1% (4) 100%	18% (66) 100%	3% (12) 100%	50% (181) 100%	3% (11) 100%	100% (361) 100%	2.2

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

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TABLE 12

DISTRIBUTION OF INFORMATION ACROSS INTERACTIVE MANAGERIAL DECISIONS

Categories of Managerial Decisions	Categories of Information								
	Observed Student Behaviour	Previously Observed Student Behaviour	Student Environment	Teacher Knowledge of Self and Instructional Mater.	Strategy Preference	Teacher Assessments - Students	Teacher Assessments - Lesson Strategies and Progress	All Categories of Information	Average Information Per Decision
Strategy Decisions (n=50)	33% a (33) b 62%	0	0	26% (26) 74%	12% (12) 67%	16% (16) 50%	13% (13) 81%	100% (100) 65%	2.0
Desist Decisions (n=19)	42% (13) 25%	0	0	19% (6) 17%	13% (4) 22%	19% (6) 19%	7% (2) 13%	100% (31) 20%	1.6
Null Decisions (n=9)	30% (7) 13%	0	0	13% (3) 9%	9% (2) 11%	43% (10) 31%	4% (1) 6%	100% (23) 15%	2.6
Totals (n=78)	34% (53) 100%	0	0	23% (35) 100%	12% (18) 100%	21% (32) 100%	10% (16) 100%	100% (154) 100%	2.0

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

reported no pieces of data concerning knowledge of the students' environment in the formulation of managerial decisions.

Decision Alternatives

Table 13 examines the frequency with which decision alternatives were considered and reveals that of the 242 interactive decisions examined, less than 14% were reportedly formulated after the conscious consideration of more than 1 alternative action. Table 13 also indicates that of all the instructional decisions, 143 (87%) were formulated with the conscious consideration of only one decision action. Of the 78 interactive managerial decisions that were identified, 66 (85%) were formulated after the conscious consideration of one decision action. In addition, the Table shows that 21 (13%) instructional and 12 (15%) managerial decisions involved the conscious consideration of two or more alternative decision actions.

Decision Feedback

Tables 14 through 16 examine the incidence with which feedback information was received following the implementation of interactive decisions. Table 14 reveals that the teacher was aware of feedback information in relation to 32 interactive instructional decisions and 28 interactive managerial decisions. For the total 60 decisions, 25% of all interactive decisions, she reported 73

TABLE 13

DISTRIBUTIONS OF ALTERNATIVE ACTIONS ACROSS INTERACTIVE DECISIONS

Prime Categories of Interactive Decisions	Number of Alternatives Considered				Distribution Across All Classes
	1	2	3	4	
Instructional Decisions	87% a (143) b 68% c	11% (18) 62%	1% (2) 67%	1% (1) 100%	100% (164) 68%
Managerial Decisions	85% (66) 32%	14% (11) 38%	1% (1) 33%	0	100% (78) 32%
Totals	86% (209) 100%	12% (29) 100%	1% (3) 100%	0.4% (1) 100%	100% (242) 100%

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 14

DISTRIBUTIONS OF FEEDBACK INFORMATION ACROSS INTERACTIVE DECISIONS

Prime Categories of Interactive Decisions	Number of Decisions for Which Feedback Observed	Pieces of Feedback Information Reported	Average Number of Pieces of Feed-back per Decision
Instructional Decisions (n=164)	32 19% a	40 55%	1.2
Managerial Decisions (n=78)	28 36% b	33 45%	1.2
Total (n=242)	60 25% c	73 100%	1.2

a - Percentage of Instructional Decisions
b - Percentage of Managerial Decisions
c - Percentage of total Interactive Decisions

pieces of feedback information--an average of 1.2 pieces of feedback information per decision.

Table 15 reveals that the major source of decision feedback following the implementation of instructional decisions was the teacher's observations of student behaviour. Of the 40 pieces of decision feedback, 25 (62%) were related to this type of feedback.

Table 16 reveals that in regard to interactive managerial decisions, the teacher relied more on observed student behaviours as decision feedback than on her estimates of her students. Of the 33 pieces of feedback information perceived following the implementation of managerial decisions, 20 (61%) were observations of the students' behaviours.

Decision Congruence

Tables 17 through 19 examine the incidence of decision congruence, with regards the type of interactive decision. Table 17 reveals that 235 (97%) of the 242 reported interactive decisions were judged to be congruent with their intent. Among the instructional decisions the outcomes of 159 out of 164 (97%) were congruent with the teacher's reported decision intent. Similarly, of the reported managerial decisions 76 out of 78 (97%) were judged to be congruent with the teacher's reported intent.

With a focus on just instructional decisions, Table 18

TABLE 15

DISTRIBUTION OF FEEDBACK INFORMATION ACROSS INTERACTIVE INSTRUCTIONAL DECISIONS

Categories of Instructional Decisions	Feedback		
	Observed Student Behaviour	Assessments/ Estimates of Students	Distribution Across All Categories
Strategy Decisions (n=122)	64% a (18) b 72% c	36% (10) 67%	100% (28) 70%
Student Questioning Decisions (n=27)	100% (4) 16%	0	100% (4) 10%
Null Decisions (n=7)	50% (3) 12%	50% (3) 20%	100% (6) 15%
Planning Decisions (n=8)	0	100% (2) 13%	100% (2) 5%
Total Decisions (n=164)	62% (25) 100%	38% (15) 100%	100% (40) 100%

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 16

DISTRIBUTIONS OF FEEDBACK INFORMATION ACROSS INTERACTIVE MANAGERIAL DECISIONS

Categories of Managerial Decisions	Feedback		Distributions Across All Categories
	Observed Student Behaviour	Asssessments/ Estimates of Students	
Strategy Decisions (n=50)	55% a (11)b 55% c	45% (9) 69%	100% (20) 61%
Desist Decisions (n=19)	64% (7) 35%	36% (4) 31%	100% (11) 33%
Null Decisions (n=9)	100% (2) 10%	0	100% (2) 6%
Totals (n=78)	61% (20) 100%	39% (13) 100%	100% (33) 100%

a - Row Percentage
b - Absolute Frequency
c - Column Percentages

TABLE 17

DECISION CONGRUITY ACROSS INTERACTIVE DECISIONS

Categories of Interactive Decisions	Decision Congruity	Decision Incongruity	Distribution Across All Categories
Instructional Decisions	97% a (159) b 68% c	3% (5) 71%	100% (164) 68%
Managerial Decisions	97% (76) 32%	3% (2) 29%	100% (78) 32%
Totals	97% (235) 100%	3% (7) 100%	100% (242) 100%

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

shows that over 96% of all reported interactive instructional decisions were judged as being congruent with the teacher's intent. Reported strategy decisions and student questioning decisions were judged as being congruent more often than were the null instructional and planning decisions.

When attention is shifted to managerial decisions (Table 19), we note that over 98% of these were judged to be congruent with the teacher's intent. As is evident, all of the reported strategy decisions were judged to be congruent.

Decision Rationale

Tables 20 through 22 summarize the frequencies with which various types of decision rationale occurred, in relation to the various types of interactive decisions. Table 20 reveals that the five most frequently reported rationale statements were:

1. Expectations of Student State of Cognition
2. Expectations of Student State of Behaviour
3. Estimates of Student State of Cognition
4. Estimates of Lesson Pacing
5. Teacher States of Cognition

On the average, 1.5 rationale statements were associated with each interactive decision. Furthermore, on the average, the teacher provided more rationale statements for managerial decisions than for instructional decisions.

TABLE 18

DECISION CONGRUITY ACROSS INTERACTIVE INSTRUCTIONAL DECISIONS

Categories of Instructional Decisions	Decision Congruity	Decision Incongruity	Distribution Across All Categories
Strategy Decisions	98% a (120) b *76%* c	2% (2) *40%*	100% (122) *74%*
Student Questioning Decisions	100% (27) *17%*	0	100% (27) *17%*
Null Decisions	71% (5) *3%*	29% (2) *40%*	100% (7) *4%*
Planning Decisions	87% (7) *4%*	13% (1) *20%*	100% (8) *5%*
Totals	97% (159) *100%*	3% (5) *100%*	100% (164) *100%*

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 19

DECISION CONGRUITY ACROSS INTERACTIVE MANAGERIAL DECISIONS

Categories of Managerial Decisions	Decision Congruity	Decision Incongruity	Distribution Across All Categories
Strategy Decisions	100% a (50) b *66% c*	0	100% (50) *64%*
Desist Decisions	95% (18) *24%*	5% (1) *50%*	100% (19) *24%*
Null Decisions	89% (8) *10%*	11% (1) *50%*	100% (9) *10%*
Totals	97% (76) *100%*	3% (2) *100%*	100% (78) *100%*

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

TABLE 20

DISTRIBUTION OF RATIONALES ACROSS INTERACTIVE DECISIONS

Categories of Interactive Decisions	Categories of Rationales						Total Rational Statements	Average Statement Per Decision
	Teacher Expectations	Teacher Assessments - Students	Teacher Assessments-Lesson Strategies & Progress	Strategy Preferences	Established Routines	Self Referenced		
Instructional Decisions (n=164)	32% a (72)b 68% c	24% (55) 63%	16% (36) 57%	10% (24) 67%	4% (10) 100%	14% (31) 74%	100% (228) 66%	1.4
Managerial Decisions (n=78)	29% (34) 32%	28% (32) 37%	23% (27) 43%	10% (12) 33%	0	10% (11) 26%	100% (116) 34%	1.5
Total Decisions (n=242)	31% (106) 100%	25% (87) 100%	18% (63) 100%	11% (36) 100%	3% (10) 100%	12% (42) 100%	100% (344) 100%	1.4

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

The most frequently produced types of rationale statements for interactive instructional decisions were:

1. Expectations for Student States of Cognition
2. Expectations for Student States of Affect
3. Estimates of Student States of Cognition
4. Teacher States of Cognition
5. Instructional Strategy Preferences

and the most frequently provided rationale statements for managerial decisions were:

1. Expectations for Student States of Behaviour
2. Estimates of Lesson Pacing
3. Estimates of Student States of Behaviour
4. Estimates of Student States of Cognition
5. Teacher States of Cognition

With a focus solely on instructional decisions, we find from Table 21 that, on the average, the teacher provided more rationale statements for null instructional decisions than for any of the other sub-categories. Table 21 also reveals that interactive planning decisions accounted for the least number of rationale statements.

Of the 151 rationales provided for strategy decisions, 53 (35%) related to Teacher Expectations. Altogether, 32% of the rationale associated with instructional decisions focussed on the teacher's expectations for student

TABLE 21

DISTRIBUTION OF RATIONALES ACROSS INTERACTIVE INSTRUCTIONAL DECISIONS

Categories of Instructional Decisions	Categories of Rationales							
	Teacher Expectations	Teacher Assessments-Students	Teacher Assessments-Lesson Strategies & Progress	Strategy Preferences	Established Routines	Self Referenced	Total Rationale Statements	Average Statement Per Decision
Strategy Decisions (n=122)	35% a (53)b *74% c*	21% (31) *56%*	16% (24) *67%*	10% (15) *62%*	5% (8) *80%*	13% (20) *64%*	100% (151) *66%*	1.2
Student Questioning Decisions (n=27)	33% (14) *19%*	31% (13) *24%*	10% (4) *11%*	12% (5) *21%*	4% (2) *20%*	10% (4) *13%*	100% (42) *18%*	1.6
Null Decisions (n=7)	7% (2) *3%*	41% (11) *20%*	22% (6) *17%*	4% (1) *4%*	0	26% (7) *23%*	100% (27) *12%*	3.8
Planning Decisions (n=8)	38% (3) *4%*	0	24% (2) *5%*	38% (3) *13%*	0	0	100% (8) *4%*	1.0
Totals (n=164)	32% (72) *100%*	24% (55) *100%*	16% (36) *100%*	10% (24) *100%*	4% (10) *100%*	14% (31) *100%*	100% (228) *100%*	1.4

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

behaviour, affect, or cognition.

The teacher's assessments of her students' behaviours, cognition, and affect accounted for 20% of all instructional strategy decision rationale statements provided. Judgements of the lesson strategies and progress accounted for 16% of these rationale statements.

Of the 45 questioning decision rationale statements 33% were expectations for students' states of behaviour, cognition and affect and 31% were assessments of students' behaviours, cognition and affect.

The teacher's assessments of her students' behaviours, cognition and affect accounted for 41% of the null instructional decision rationale statements produced. Table 21 also shows that an additional 6 (22%) of these rationales were evaluations of lesson strategies and progress. Seven (26%) of the rationale statements for interactive null instructional decisions were statements of the teacher's states of cognition. Of the 8 interactive planning decision rationale statements provided by the teacher 3 (37%) concerned the teacher's expressed expectations for her students' states of behaviour and affect. Another 3 (37%) rationale statements were the teacher's expressed instructional and managerial strategy preferences.

Turning now to interactive managerial decisions, Table 22 reveals that the teacher provided relatively more

TABLE 22

DISTRIBUTION OF RATIONALES ACROSS INTERACTIVE MANAGERIAL DECISIONS

Categories of Managerial Decisions	Categories of Rationales						Total Rationale Statements	Average Rationale Per Decision
	Teacher Expectations	Teacher Assessments-Students	Teacher Assessments-Lesson Strategies & Progress	Strategy Preferences	Established Routines	Self Referenced		
Strategy Decisions (n=50)	24% a (19)b *56%* c	34% (27) *84%*	29% (23) *85%*	6% (5) *42%*	0	7% (6) *55%*	100% (80) *69%*	1.6
Desist Decisions (n=19)	52% (14) *41%*	4% (1) *3%*	15% (4) *15%*	22% (6) *50%*	0	7% (2) *18%*	100% (27) *23%*	1.4
Null Decisions (n=9)	11% (1) *3%*	44% (4) *13%*	0	11% (1) *8%*	0	33% (3) *27%*	100% (9) *8%*	1.0
Totals (n=78)	29% (34) *100%*	27% (32) *100%*	23% (27) *100%*	10% (12) *100%*	0	10% (11) *100%*	100% (116) *100%*	1.5

a - Row Percentage
b - Absolute Frequency
c - Column Percentage

rationale statements for managerial strategy decisions than for other sub-categories. The least number of rationale statements was provided for null managerial decisions.

Of the 80 managerial strategy rationale statements provided, 27 (34%) concerned the teacher's assessments of her students' behaviours, cognition, and affect, 23 (29%) were evaluations of the lesson strategies and progress, and 19 (24%) concerned the teacher's expectations for her students' behaviours, cognition and affect.

The teacher's expectations for and assessments of her students' behaviours and lesson strategies accounted for 86% of all the managerial strategy rationale statements.

Table 22 also reveals that 14 (52%) of the rationale statements for desist decisions were based on the teacher's expectations for her students. This was the largest sub-group of desist decision rationale statements. Moreover, only 1 teacher assessment of her students was provided as a rationale statement for desist decisions.

In connection now with rationales for null managerial decisions, 44% of the rationale statements concerned the teacher's judgements of her students and 33% concern the teacher's states of cognition. The remaining rationale statements for null managerial decisions were one statement of teacher expectation and one statement of managerial strategy preference.

PART II

Findings From The Methodology

The findings reported in this section provide information on concerns that attend the use of stimulated recall using videotaping as a research tool. Specific questions that are addressed are as follows:

1. What problems were encountered and what effects were observed in connection with the use of videotape equipment in the classroom and in the stimulated recall interview sessions?
2. Was the researcher able to identify the teacher's interactive decisions from observing the teacher's behaviours in the classroom?
3. Was the teacher able to recall the thoughts she had during the formulation of the interactive decisions?

Where appropriate, data from the stimulated recall interview transcripts are included for illustrative purposes.

Problems Encountered and Effects Observed

Four concerns have been addressed in this section. These focus upon (a) the familiarization procedures, (b) problems and effects associated with the classroom presence of the researcher and the videotape equipment, (c) effects on the teacher of viewing her own behaviours on the videotapes, and (d) problems encountered during the stimulated recall interviews.

The Familiarization Process

The purposes of the familiarization phase of the study were twofold: (a) to ensure that both the teacher and the students were desensitized to the presence of the researcher and his equipment prior to the collection of data, and (b) to develop a rapport with the teacher that would facilitate the collection of rich, introspective data.

During the five days of classroom familiarization, the researcher observed that the students gradually paid less attention to the videotape equipment and the researcher. After the first five days, students only occasionally displayed behaviours that indicated a sensitivity to the researcher or his equipment; such behaviours included waving hands in front of the camera and making 'funny faces'. However, it was observed that those students who did display this behaviour frequently displayed other attention-seeking behaviours during the lessons.

At one point during the early data gathering phase, a student bumped into the video-camera as she was leaving the room. She appeared to be startled and said, "Have you been here all morning? I didn't see you."

From the initial contact with the teacher to the end of the data collecting phase, the researcher perceived that a positive rapport developed with the teacher. The following data from the stimulated recall interview transcripts provide evidence of this rapport.

> . . . I just ignored it and went on. And I had to make a conscious effort at that, because I was a little cheesed off with her attitude.
>
> . . . well, I felt dumb . . . I just thought, oh God, here we go again . . .
>
> . . . I must admit that at times I just neglect her. Because I'm tired of asking her over and over again to do it that I ignore her and some days just say, "Geez, I just don't want to be bothered."
>
> I: Your lunch is not as large these days.
>
> T: No, I've been getting less and less. I'm getting too lazy to make them in the morning.
>
> . . . she has lots of family problems at home, right now, you know. I believe her family is breaking-up right at the moment.
>
> We're going to the xxxxx for a few drinks after school. Would you like to join us?

For the teacher to volunteer these thoughts and observations required a substantial amount of trust. Many of the statements made by the teacher were extremely sensitive and could have been viewed as threatening to her.

Problems and Effects in the Classroom

After the familiarization phase, few problems were encountered in the classroom. As noted above, those students who exhibited attention-seeking behaviour for the researcher also displayed this behaviour before the teacher and fellow students. One problem that was bothersome developed due to the use of a corded microphone. The teacher's attention was frequently drawn to the equipment as she stepped on the microphone cord or whenever the cord snagged on a student's desk. It was not possible to determine if these distractions had any negative effects upon the collection of data.

On the fourteenth day of classroom observation, a coder engaged in a research project under the direction of a staff member of the University of Alberta entered the classroom. The researcher was not aware that this person would be present, as the teacher had herself forgotten. The presence of the coder appeared to have a negative effect upon the teacher's behaviors, although it was not possible to measure this effect.

During the time that the coder was present in the classroom, the pace of the lesson was very rapid. This is evidenced by the videotape record of the lesson and the following statement made by the teacher:

> The pace was quite rapid. . . . I think it was . . . because of the two people being there, you being there and of the other lady being there as well. . . . (Y)ou've got sort of two people on your mind, sort of thing. So, it's . . . not an easy situation.

Effects of Self Viewing Teaching Behaviours

One matter of interest in this study was the effects that viewing her own teaching behaviours, on videotape, might have upon the teacher. During the stimulated recall interviews, the teacher made frequent reference to her teaching behaviours, as she viewed them on the videotape:

> . . . did I really do that?
>
> He must think I'm a dummy for taking his book, then.
>
> That was good . . . I'm glad I did that!
>
> Oh, I don't like that. It made Ronnie . . . oh, he was totally unnerved. He was just sitting there. Just shaking like this. . . . I think I'll make a little sign, "You Can Interrupt" and "You Can't Interrupt." Maybe that will help.

However, as with similar comments, this stated action was not carried out later in the classroom, during the time the researcher was present.

Problems Encountered During the Interviews

No problems were encountered during the stimulated recall interviews. The teacher did display a reluctance to stop the videotape playback unit, even though the control was within her reach. However, she freely initiated most of the interchanges between her and the researcher and provided rich descriptions of her thoughts with a minimum of prompting.

Frequently the teacher expressed a positive attitude towards the experiences of both the observation and the interviews. She did, though, express her feelings of fatigue following the interviews.

> This has been a great experience. I'd recommend it to any teacher. Do you want to do this again? I know of someone who'd love to do it. . . .
>
> . . . ya, this is good. I've learned so much about my teaching. But it is tiring. I have to concentrate so much on what I think about . . .

Throughout the ten interviews only two interruptions were experienced. These occurred when the teacher received telephone calls from parents of her students.

Identification of Interactive Decisions

One question concerning the identification of interactive decisions is addressed in this study: how does the researcher's ability to identify the teacher's interactive decisions by observing lessons compare with the teacher's ability to identify her decisions from viewing the videotape records of her teaching.

To identify interactive decisions, the researcher looked for events that were possible decision antecedents or stimuli and then watched to see if there were any changes in the teacher's behaviour. Such stimuli were students' behaviours or the instructional material that was being used. Each time a stimulus was observed, it was recorded in the chronology, as were the teacher's behaviours immediately following that stimulus.

In all, 375 stimulus-subsequent behaviour units were entered in the chronology. These entries were used to test the researcher's ability to identify the teacher's interactive decisions from observation. This procedure is supported by Sutcliffe and Whitfield (1979), who used a similar approach in a British study of classroom-based teaching decisions.

Due to the lack of time in the interview sessions, only 298 researcher identified decisions were examined. Of these 298 decisions, 206 were judged to be instructional and 92 were judged to be managerial decisions.

Table 23 displays (a) the number on interactive decisions identified by the researcher during observation and recorded in the chronology, (b) the number of interactive decisions identified by the teacher through observations of the videotape, and (c) the number of decisions identified by both the teacher and the researcher.

Of the 298 interactive decisions identified by the researcher through the observation of the teacher's

TABLE 23

CORRESPONDENCE BETWEEN RESEARCHER IDENTIFIED AND TEACHER IDENTIFIED DECISIONS

Identifying Party	Decisions			Total Decisions
	Instruction Decisions	Managerial Decisions	Null Decisions	
Decisions Identified by Researcher Only	206	92	9	298
Decisions Identified by Teacher Only	164	78	16	242
Decisions Identified by Both Researcher and Teacher	52% a (107)b 65% c	72% (66) 85%	50% (1) 6%	58% 242 72%

a - Percentage of Reseacher Identified Decisions
b - Absolute Frequency
c - Percentage of Teacher Identified Decisions

classroom behaviours, only 173 of the 242 teacher-identified decisions or 58.1% were also identified by the teacher.

There were 16 null decisions identified by the teacher, both instructional and managerial. Only one of these was identified by the researcher. This finding is similar to that of Sutcliffe and Whitfield (1979: 17, 18), who found that it was difficult to identify a null decision, as, in most cases, there was no observable change in the teacher's behaviour.

Teacher Description of Decision-Related Thoughts

During the ten stimulated recall interviews, the teacher supplied a vast volume of units of thought that deal with her interactive decisions. Over 5,000 of these units were identified during the micro-analysis. These units are so rich in description and explanations that they defy adequate summarization; nevertheless, they provide a strong foundation for the discussion that follows.

CHAPTER V:SUMMARY AND DISCUSSION

CHAPTER V

SUMMARY AND DISCUSSION

Summary

Only in the very recent history of educational research has interest been shown in the teacher as decision maker and in the processes with which teachers formulate interactive decisions. From this interest in decision research has arisen the view that the results of such investigations might provide valuable insights into the specific elements of the interactive decision process, insights that could provide useful information for teacher pre-service and in-service education. As well, these insights may provide much needed information for school administrators who, in their daily duties and activities, affect and are affected by the decision processes of teachers.

The Study

This study was designed as a naturalistic exploratory investigation of one teacher's interactive decision making, in a variety of teaching situations. In order to facilitate the gathering of information concerning the decision process, three questions were posed. These focussed upon the form and substance of teacher interactive decision making and the use of heuristics in decision formulation. Accordingly, the following topics were investigated:

1. The kinds of interactive decisions formulated by a teacher and the incidence of such decisions.
2. The various stimuli to which a teacher responds with an interactive decision.
3. The type of information that a teacher uses in the formulation of an interactive decision and the sources of that information.
4. The degree to which teachers formulate estimates and assessments of students' states of mind, behaviour and other characteristics and of estimates of the strategies employed and the types of information on which such estimates are based.
5. The type of feedback that a teacher processes following the implementation of interactive decisions and the frequency with which the decisions are formulated result in "congruent" outcomes.
6. The types of rationale that a teacher provides for the decisions formulated.

The Method

The data used in this study were collected from three sources. Ten lessons were videotaped to create a record of the subject teacher's behaviours during the interactive phase of teaching. These lessons consisted of 3 mathematics lessons, 3 reading lessons, 2 spelling lessons, 1 group discussion and 1 language arts lesson, all at the grade 6 level. Second, a chronology of the teacher's decision making was maintained to determine if the researcher was able to identify the teacher's decisions during the act of teaching. The third type of data was collected through a series of ten stimulated recall interviews using the videotape records of the observed lessons as stimuli.

Data Analysis

The data collected from the stimulated recall interviews were analyzed at two levels of specificity. At the micro-level the interview transcripts were coded using a content analysis system specifically designed for this data. Through the use of this system, the coded data were placed into 4 major categories, consisting of decision antecedent, decision information, decision feedback and decision rationale. As well, the analysis enabled the investigator to determine the types of decisions formulated, the number of alternatives considered, and the degree of congruence at each of the decision moments reported by the teacher. At the macro-level data were examined to extract global trends and patterns in the teacher's decision making and to obtain information relevant to the question concerning the role of heuristics in the decision process.

Overview of Discussion

Two major issues formed the foci of this investigation. The first issue focussed upon the form and substance of teacher interactive decision making and dealt with the types of interactive decisions formulated, the concomitants of interactive decisions, and teacher use of heuristic techniques in the formulation of interactive decisions. The second issue dealt with the adequacy of stimulated recall with videotapes as a research tool in the studying of teacher interactive decision making. These issues gave rise to 6 research questions.

The two levels of analysis, micro and macro, designed to obtain information towards answers for these questions, resulted in the emergence of 23 major findings. Each of these is discussed below.

Question 1.1

What types of interactive decisions are formulated by classroom teachers?

FINDING 1.

Two prime categories of interactive decisions were identified: (a) interactive instructional decisions and (b) interactive managerial decisions.

The review of the literature led to the identification of three main categories of teacher interactive decisions: (a) instructional decisions, (b) managerial decisions, and (c) environmental decisions. Finding 1 appears to be compatible with those obtained by Whitfield (1974b), Clark and Peterson (1976), and Sutcliffe and Whitfield (1979). The category of environmental decisions appears to be imbedded within the category of instructional decisions identified in this study.

The frequency with which interactive decisions occurred in this study, does not correspond with the findings of Marland (1977:132), who found that teachers formulate fewer than 10 interactive decisions per lesson. Findings arising from this study indicate that teachers formulate an average of more than 20 interactive decisions per lesson. This discrepancy appears to be explained by an examination of the definition of interactive decisions. Although Marland's definition of an interactive decision is quite broad, in that it refers to a conscious choice of behaviour during "the phase of teaching when the teacher is involved in instructional activity with children in the classroom

(Marland, 1977:88)", the criteria that he applies for the identification of interactive decisions appear to result in restricted meaning. Marland's operational definition of an interactive decision comprehends 3 criteria:

1. explicit reference to two or more alternatives,
2. explicit reference to the selection of one alternative and commitment to that selection, and
3. evidence of the implementation of that selection of action.

Thus, when Marland observed his study teachers responding to stimuli with the reported consideration of only one course of action, he labled such behaviours as deliberate acts. However, as he claims:

> In effect many deliberate acts could quite conceivably have been decisions if the teacher had not failed to mention the fact that he was considering an alternative. (1977:89)

The question of decision alternatives is taken up again later in this Chapter but it is important to note at this point that investigators have adopted various definitions of interactive decisions. Whitfield (Marland, 1977), for example, claims that the issue of the definition has not been adequately addressed. Sutcliffe and Whitfield (1979), though, have described a decision as a conscious act that occurs when at least two alternatives are available, the choice to change behaviour and the choice not to change behaviour. With this in mind, then, Marland's "deliberate act" may also be considered a decision and, when this is done, Marland's findings more closely parallel those of this study. The results of this study, furthermore, appear to support the claims by Farr and Brown (1971), Whitfield (1974b), and Shavelson (1976b) that teachers do formulate many decisions in their interactions with children in the classroom.

FINDING 2.

On the average, more decisions are formulated during fast-paced, intense periods than during slower-paced relaxed periods.

Again, the findings of this study contradict those of Marland's. Marland (1977:189) claims that more decisions are formulated during slow-paced, relaxed lessons than in more rapid-paced, intense lessons. It is possible, though, as Marland (1977:191) says:

> . . . that teachers in the study were not familiar with the model of the teacher as a decision maker and were not accustomed to thinking of their classroom behaviours in terms of the decision making metaphor.

This was precisely the reason why the teacher in this study was engaged, before data collection began, in lengthy discussions focussing upon the decision process.

An interesting sub-finding is that, on the average, managerial decisions occurred less frequently in fast-paced lessons than in slower-paced lessons. The literature appears to be silent with regards this phenomenon; however, one possible explanation is that as the pace of teacher-directed lessons increases there is a corresponding increase in the rate of student-teacher interaction. The possibility also exists that the incidence of behaviour deviations decreases because the students' attention is focussed upon either the teacher or the lesson material. In effect, the student is too busy to misbehave. Evidence in support of this explanation is found in the videotape records of the observed lessons. In corollary fashion, it was determined that as the rate of student-teacher interactions decreased in teacher-directed lessons, the incidence of managerial decision formulation increased.

Another sub-finding that reinforces the above observations is that the incidence of managerial decisions decreased during lessons that were classified as less teacher-directed and more student-directed. Possibly a higher degree of student involvement developed during these periods. Although this phenomenon has not been investigated fully in this study, its presence indicates the need for further research.

FINDING 3.

The majority of interactive decisions were instance specific.

This Finding appears to be consistent with those obtained by Clark and Peterson (1976), who claim that teachers tend not to use their decisions to facilitate the evolution of a master plan but to deal with specific problems as they arise. One possible explanation for the phenomenon of instance specificity is that the teacher is dealing with a multitude of decision stimuli, many of them uncertain, and imbedded in a context of rapid interactions, the teacher appeared to respond not with the aim of directing the decisions towards a pre-planned end but to solving an immediate problem or concern. This explanation receives support from Cone (1978) and Shavelson and his colleagues (1978).

Question 1.2

What are the concomitants of a teacher's interactive decisions?

FINDING 4.

Usually more than one antecedent was reported as stimulating the teacher's formulation of interactive decisions.

From the evidence obtained in this study, it appears that teacher decisions are responses to a variety of different stimuli. Often the observation of student behaviours, for example, would result in the teacher's formulation of an assessment of that behaviour in terms of the student's cognitive and affective states. Together these two stimuli act as decision antecedents which precipitate the need to formulate an interactive decision.

Support for this explanation may be found in other studies of teachers' decision making (Jackson, 1968; Farr and Brown, 1971; Shavelson, 1976b; Cone, 1978). A common thread running through the observations reported in these studies is the great volume of stimuli with which teachers are bombarded during the school day. Jackson (1968), for example, observes that student-teacher interactions are extremely rapid and that the demands upon a teacher's attention are great.

FINDING 5.

More antecedents were associated with managerial decisions than with instructional decisions.

There appears to be some similarity between this finding and those of Cone (1978) and Shavelson and company (1978). Cone's data lead to the conclusion that behavioural cues have more influence upon the stimulation of managerial decisions than instructional decisions. Shavelson and his colleagues intimate that in the formulation of instructional decisions teachers tend to rely on teaching beliefs and principles as much as observed behaviours.

One possible explanation for this finding is that when the teacher bases her decisions upon teaching beliefs and principles, there may be a tendency to exclude more student originating stimuli (Rokeach, 1960; Kahneman and Tversky, 1972, 1974; Slovic, et al., 1977). The teacher's instructional decisions may be more programmed through beliefs and principles than are her managerial decisions. However, as there were no provisions within this study for obtaining an understanding of the teacher's beliefs and teaching principles or their relationship to her interactive decisions, this explanation is only speculation. There appears to be a need, though, to explore this relationship.

FINDING 6.

Of the three prime categories of decision antecedents that were identified, student originating antecedents were responded to most often.

Figures presented in this study show that there was a greater volume of student originating stimuli than teacher originating stimuli or environmental originating stimuli. This finding may be understood in light of the vast number of interactions that the teacher and the students engaged in during the observed lessons. Thus it may be seen to be reasonable that student originating antecedents would be the most frequently reported decision antecedent.

FINDING 7.

Two prime categories of decision information were identified: (a) student referenced information and (b) teacher referenced information.

Finding 7 is similar to those obtained by Shavelson and Atwood (1977), Shavelson and company (1978) and Russo (1978). From the evidence presented in these studies and from the evidence obtained in this study, one may conclude that the teacher is more aware of decision information that is most relavent to her activities in the classroom.

FINDING 8.

The teacher's estimates of her students' states of mind, behaviour and other characteristics comprised the largest category of decision information that was used by the teacher.

Evidence gleaned from this study indicates that the teacher made many inferences about her students' states of mind, behaviour, and other characteristics and that she made extensive use of these assessments in the formulation of her interactive decisions. Some disagreement appears to exist between these findings and the findings of the Shavelson and Atwood (1977) and the Shavelson, et al. (1978) studies. Whereas Shavelson and Atwood and Shavelson, et al. concur that teachers do formulate estimates of their students' states of cognition, affect and behaviour, they reject the notion that teachers use these estimates in the formulation of interactive decisions. Rather, they have concluded that these estimates are used primarily in the formulation of pre-active decisions. However, these studies were conducted in laboratory settings, not in natural settings. The students with whom the researchers were dealing were not familiar to the subjects but were strangers, in strange surroundings. The possibility exists, therefore, that a replication of these studies in a natural setting might result in completely different findings.

There is another possible explanation, one that relates to teacher personality factors. In her attempt to be 'helpful', the teacher might have provided information that she thought the investigator wanted to hear. This gives rise to the issue of "reconstructed reality" and the possibility that the information provided by the teacher was not the information that may have been perceived during the formulation of those assessments and estimates. However, this finding was consistent throughout the ten interviews and leads to the suggestion that the teacher was reporting what she perceived.

A third explanation lies in the teacher's familiarity with her students. The more that the teacher knows about her students, through the experience gained through interactions throughout the year, the greater is the possibility that she has formed interactive estimates of their states of cognition, affect and behaviour and that these estimates would be a natural source of decision data. In any event, further study on teacher formulation and use of estimates and assessments is warranted. Such research might focus upon the information that the teacher uses in the formulation of such judgements and the veracity of the teacher's perception of that information.

FINDING 9.

More pieces of information were reported as being used in the formulation of each interactive instructional decision the in the formulation of each interactive managerial decision.

As indicated in the videotape records the time spend in the formulation of interactive instructional decisions appears to be generally greater than that devoted to the formulation of interactive managerial decisions. It would appear that different degrees of urgency are attached by the teacher to the two types of decisions. The data of this study indicate that the teacher felt a greater urgency in dealing with behavioural deviation stimuli than with instructional stimuli. The teacher may in fact become aware of more information when there is not a sense of urgency in the need to arrive at a decision.

FINDING 10.

The vast majority of interactive decisions identified were reportedly formulated after consideration of only one course of action.

Analysis of the data indicates that the teacher considered only one course of action for the majority of her decisions. However, during the interviews, she often mentioned that there were other alternatives she could have chosen but they never came to her during the decision moment. Phrases such as "I knew this was the best thing to do", "under the circumstances nothing else would have worked", and "No, I hadn't thought of anything else. I knew this would work" indicate that the teacher had a repertoire of possible decision alternatives but that these were not examined during the formulation of the decisions.

These findings are in agreement with those of Whitfield (1974b), Marland (1977), Cone (1978), and Shavelson, et al. (1978). Marland's (1977:236) findings lead him to suggest that the decision making process is one that involves limited rationality, in that a teacher chooses from a limited number of possible alternatives based upon "the size of the repertoire of alternatives which the teacher has at his disposal (Marland, 1977:194)."

Hargreaves (1979:74) indirectly offers another explanation for this phenomenon. Hargreaves claims that many teacher decisions are routinized, through experience, in order to avoid decision anxiety, "since the immediacy and constantly shifting nature of classroom events demands that most classroom decisions be made 'on the spot' . . ."

The phenomenon of limited generation of alternatives, gives rise to an interesting and important question. If, as Marland and Hargreaves suggest, the teacher routinizes her decision making through a repertoire of possible actions, is it possible that an unconscious screening process occurs, one that eliminates the "inappropriate" actions before they rise to the conscious level? Further investigations into teacher decision alternative generation might usefully focus on this question, for the existence of such a mechanism would have implications for both the training and supervision of teachers.

FINDING 11.

Decision feedback information was reportedly sought in very few instances.

Figures presented in this study indicate that the majority of instructional and managerial decisions were not evaluated through the use of feedback information. Further, the percentage of perceiving feedback information following the implementation of instructional decisions was approximately half that of managerial decisions. Possible explanations for these phenomena may be found in the findings of Cone (1978) and Shavelson, et al. (1978).

In the first place, Shavelson and his colleagues (1978) claim that in the formulation of instructional estimates, teachers use beliefs and principles of teaching as often as observations of student behaviour. Cone (1978), on the other hand, found that observed student behaviours had more significant effects upon the formulation of managerial decisions than beliefs or principles. There is a reasonable possibility, then, that when a teacher bases her decisions upon beliefs and principles, she will not actively seek feedback, since confirmation is already imbedded in those beliefs and principles. Support for this hypothesis is to be found in the writings of Rokeach (1960), Rotter (1966), Sarason (1972), Phares (1976), and Radford (1977).

Second, instructional decisions may be more highly routinized than managerial decisions; accordingly, the consequences of instructional decisions may tend to be fairly certain and easily predicted. On the other hand, the consequences of managerial decisions may tend to be more uncertain and not as easily predicted, as findings from this study suggest. Thus, there is reason to speculate that the teacher would actively seek feedback information more often following the implementation of managerial decisions than instructional decisions.

From these findings, it would appear that there are two areas of investigation that require attention: (a) the relationship between the frequency with which a teacher seeks feedback information on interactive decisions and the teacher's beliefs and principles about teaching and (b) the teacher's relative ability to predict the outcomes and consequences of managerial as opposed to instructional decisions. These two areas appear to have been virtually ignored to date and would seem to be rich fields for future research.

FINDING 12.

The outcomes of the vast majority of interactive decisions were judged to be in congruence with the intentions of those decisions.

Interactive decision congruence has, as yet, not been addressed by educational researchers. However, possible explanations for the findings on this study concerning decision congruence may be inferred from the research of Rokeach (1960), Sarason (1972), Phares (1976), Cone (1978), and Shavelson, et al. (1978). A synthesis of the findings of these studies leads to the suggestion that teachers' beliefs play a major role in the formulation of interactive decisions, in that decisions based upon beliefs and teaching principles may be prejudged to be congruent. However, this conjecture is not based upon data from this study and, therefore, warrants further investigation.

FINDING 13.

There was a higher degree of incongruence following the implementation of interactive null decisions than following the implementation of other decisions.

Micro-analysis of the data indicates that a higher degree of uncertainty was associated with the stimuli that attended null decisions. This uncertainty led, it seems, to decisions not to change pre-decisional behaviour. Null decisions may therefore be decisions to delay substantic decision making pending further information and a reduction of uncertainty.

FINDING 14.

The largest sub-categories of reported decision rationales were: (a) teacher expectations for students and (b) teacher estimates of students.

Findings that have emerged from this study add support to those obtained in recent studies of teachers' thought processes (Marland, 1977; Conners, 1978a; King, 1979; Mireau, 1980). The literature on teacher expectations, although not reviewed in this report, also indicates the important role that teacher expectations play in determining teacher behaviour. It seems reasonable to suggest that in the role of information processor the teacher would have to formulate expectations for student behaviour, cognition, and affect as well as assessments of student cognition, behaviour and affect based upon these expectations. This would explain the importance that the subject of this investigation attached to these rationales for interactive decisions.

FINDING 15.

More teacher expectation and estimate rationales were reported as explanations for managerial decisions than for the instructional decisions.

Evidence arising from this study shows that the teacher exercised greater overt control over student behaviour through the formulation and implementation of interactive managerial decisions than through interactive instructional decisions. Generally, the purposes of the teacher's managerial decisions were to change behaviours that were perceived, through the teacher's expectations, to be deviant. This finding is supported by Cone (1978).

On the other hand, as Shavelson and Atwood (1977) and Shavelson, et al. (1978) have intimated, many of the rationales for interactive instructional decisions are based upon the teacher's beliefs and attitudes and, as Hargreaves (1979) states, many of these instructional decisions are routinized and habitual in nature.

Question 1.3

To what extent do teachers employ heuristic techniques in the formulation of interactive decisions?

FINDING 16. *Observed student behaviours constituted the largest single source of information reported to have been employed in the formulation of assessments of students' behaviours, states of mind, and other characteristics*.

FINDING 17. *Teacher assessments of student behaviours constituted the largest single source of information reported to have been employed in the formulation of judgements and assessments of instructional and managerial strategies*.

FINDING 18. *The teacher appeared not to confirm the validity of the estimates she formulated*.

Evidence arising from the analysis of the data obtained in this study leads to the suggestion that the teacher did employ heuristic techniques in the formulation of (a) estimates or assessments of students' states of mind, behaviours, and other characteristics and (b) to the suitability of instructional and managerial strategies. During the formulation of her assessments of student states of mind and behaviour, the teacher relied upon student overt behaviour and seemed to interpret that behaviour in terms of her frame of reference rather than the student's.

For example, the teacher usually interpreted students' shufflings in their desks as evidence of restlessness. In her terms of reference, apparently, such behaviours were representative of that particular state of affect. As another example, the teacher's observations of students sitting quietly in their desks with their books open were usually interpreted as evidence that students were engaging in learning; in the teacher's terms of reference, such behaviours were representations of the occurrence of learning. However, the validity of these estimates was never tested. The teacher appeared to assume that the assessments she formulated were accurate. From the data of this study, it appears that the teacher's previous experiences with her students had confirmed the validity of her estimates and, hence, she carried those confirmations into the assessments of her students formulated during this study.

Findings that relate to the teacher's estimates of the effectiveness of instructional and managerial strategies indicate that the teacher employed availability heuristic techniques. This is evident in the fact that she used overt student behaviours as the major type of data for the formulation of those estimates. Again, as in the formulation of estimates of students' states of mind, behaviour, and other characteristics, the teacher did not attempt to confirm her effectiveness estimates but assumed that they were effective. It does appear, then, that the findings obtained by Kahneman and Tversky (1972, 1974) are supported.

The second major issue of this study focussed upon the effectiveness of stimulated recall that utilizes videotaping procedures as a research tool for investigating a teacher's interactive decision making. Three questions arose as a result of this issue:

Question 2.1

What problems are encountered and effects observed in the use of the videotape equipment in classrooms and in stimulated recall interview sessions?

Question 2.2

Is an observer able to identify a teacher's interactive decisions from observation of the teacher's behaviours in the classroom?

Question 2.3

Is a teacher able to describe the thoughts she had during the formulation of her interactive decisions?

Five major findings arose from this study.

FINDING 19.

A five day familiarization period appeared to be an appropriate length of time to desensitize the students to the presence of the researcher and his equipment.

FINDING 20.

Pre-study interviews, statements of commitment, and pre-interview discussions appear to contribute to the development of a high degree of teacher-researcher rapport.

FINDING 21.

The teacher's viewing of her teaching behaviours appeared to have little effect upon her classroom behaviours.

FINDING 22.

The teacher, using the videotape records of her teaching behaviours, was better able to identify her interactive decisions than was the researcher, who used observations of the teacher's classroom behaviours.

FINDING 23.

The teacher was fluent in her descriptions about the thoughts she had during the formulation of her interactive decisions; her descriptions and explanations were richly detailed.

The evidence that has emerged from the macro-analysis of the study's data tends to support the findings obtained in other investigations of teacher's behaviours and thought processes that have utilized videotaping and stimulated recall interviews as data collection methods (Marland, 1977; Conner, 1978; Cooper, 1979; Tuckwell, 1979; Mireau, 1980). The accumulation of findings from these studies leads to the suggestion that one of the most appropriate methods of obtaining data of teachers' interactive decision making is through the use of such introspective methodologies.

Findings obtained in this study indicate that the quality of the data collected depends, to a large degree, upon the rapport that is developed between the researcher and the subject. Thus, the time taken to develop a trusting working relationship appears to be of great value.

At this point, it seems appropriate to address the issue of "reconstructed reality". The discussion in the literature on this issue leads to the inference that it is imperative for the interviewer to distinguish between the logic that is used at the formulation of an interactive decision and the logic that is reconstructed during the discussion of that decision. As indicated elsewhere in this report, certain cues were presented in the transcripts that enabled the researcher to make this distinction. The important aspect of this discussion of "reconstructed reality" is that it is possible to identify a teacher's "logic-in-use" (Oberg, 1975) and to distinguish that from reconstructed logic.

CHAPTER VI: CONCLUSIONS AND IMPLICATIONS

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Conclusions

The conclusions that have been drawn from this research and that are presented herein are applicable only to the teacher who was the subject of this study. Caution is advised that any attempt to generalize these conclusions beyond the confines of this study may be inappropriate. Furthermore, this investigation was postulated on the view of the teacher as a decision maker.

Interactive Decisions

An interactive decision is a choice of actions that may be taken in response to a stimulus arising from the environment in which the interaction occurred. Results of this study lead to the conclusion that a teacher formulates a vast number of interactive decisions during the school day and that these decisions are of two major types: instructional and managerial.

Interactive instructional decisions are those choices that are concerned with the delivery of instructional material and with student learning. In the case of interactive instructional decisions, the stimuli to which a teacher responds consist mainly of students' overt behaviour and the instructional material being presented.

Interactive managerial decisions tend to be decisions that focus upon the students' behaviours that the teacher judges to be deviant and/or disruptive. The stimuli which primarily elicit interactive managerial decisions are mainly overt student behaviours and estimates of students' behavioural and affective states that the teacher formulates subsequent to noticing the behaviours.

The incidence of interactive decisions appears to vary with the rate and direction of interaction. During fast-paced, intense periods of teacher-directed interaction, the number of interactive decisions formulated will be great; in addition, interactive instructional decisions will outnumber managerial decisions. On the other hand, during slower paced, more relaxed teacher-directed periods of interaction, the total number of interactive decisions formulated decreases but the ratio between instructional and managerial decisions formulated also decreases. During this type of lesson, moreover, there are usually more incidents of behaviour deviations to which the teacher feels the need to respond.

A teacher's interactive decisions tend to be instance specific. That is, they are aimed towards solving specific instructional problems or behavioural deviations.

Interactive managerial decisions in particular appear not to be based upon some pre-conceived plan.

Decision Antecedents

A classroom teacher is presented with a vast number of potential decision stimuli during the course of a lesson. Interactive decisions are responses to these stimuli or antecedents and often more than one stimulus will act as an antecedent for a teacher's interactive decisions. This seems to be more so with interactive managerial decisions than with interactive instructional decisions. There are three primary types of stimuli that will act as antecedents for a teacher's interactive decisions, (a) student originating stimuli, (b) teacher originating stimuli, and (c) environment orinating stimuli. As a result of this study, it appears that more interactive decisions are responses to student originating antecedents than to either of the other categories of decision antecedents.

Decision Information

Upon perceiving a decision stimulus and entering a decision moment, a teacher will seek information to (a) clarify the stimulus or the context in which the stimulus occurred, and (b) assist in the generating of solutions. Most of this information consists of students' overt behaviour and the teacher's assessments of the students' states of cognition, affect, and behaviour as well as estimates of the effectiveness of the instructional and managerial strategies employed. However, while there appears to be some relationship between a teacher's observations of student overt behaviours and her estimates of students' affective states and behaviours, there appears to be no such relationship (a) between a teacher's observations of student overt behaviours and her assessments of students' cognitive states and other characteristics nor (b) between observations of students' overt behaviours and estimates of the effectiveness of implemented instructional and management strategies. As a matter of fact, results of this study lead to the conclusion that other factors, such as a teacher's strategy preferences and the teacher's knowledge of the instructional material and knowledge of the student may have a more active role to play in the formulation of interactive instructional decisions than observations of student overt behaviours.

When a teacher perceives a need to formulate a managerial decision, usually following the perception of a student behaviour, the estimates that are formed of students' behaviours and affect generally appear to be based upon not only the teacher's observation of current overt behaviours but also on past overt behaviours and the teacher's knowledge of the student. Thus, as might be expected, a teacher's managerial decisions tend to be instance specific rather than fitting into an overall plan.

Decision Alternatives

Having gathered information about the perceived stimulus and the context in which the stimulus occurred, the teacher will then generate a solution. Previous research into teacher decision making has resulted in the conclusion that a teacher will generate only one or two alternatives for an interactive decision. However, it appears that more than just an ability to generate alternatives in a short space of time may be at play in decision making.

Through experiences gained in interactive situations, the teacher builds a repertoire of possible decision actions (Marland, 1977) and then, in an attempt to avoid or reduce the possible decision anxiety, the teacher routinizes the decision process (Hargreaves, 1979). Findings obtained through this study lead to the suggestion that a teacher may subconsciously screen out those alternatives that are judged to be inappropriate for the given situation and then will only consciously consider those alternatives that are judged to be applicable. Thus, even though only one decision action is mentioned, the possibility exists that many may have been considered at the subconscious level.

Decision Feedback and Congruence

The evidence gleaned from the analysis of the data collected in this study leads to the conclusion that a teacher does not actively seek feedback information for most implemented interactive decisions. Indeed, findings would suggest that a teacher's instructional decisions are confirmed by the teacher's past experiences with similar situations and the preferences that he holds for specific instructional strategies.

On the other hand, a teacher seems to more actively seek decision feedback following the implementation of interactive managerial decisions. The stimuli that usually precipitate the formulation of interactive managerial decisions, as observed in this study, appear to be perceived by the teacher as student overt behaviours. The decisions that are formulated by the teacher as responses to these stimuli, focus upon changes in behaviour. However, the teacher does not usually seek such feedback information following the implementation of a majority of interactive decisions.

The vast majority of a teacher's interactive decisions, though, is judged as being in congruence with the intent of these decisions, with or without the active search for feedback information. In addition, whereas a teacher may actively seek more feedback information following the implementation of an managerial decision, the percentage of instructional decisions judged as being congruent is identical to the percentage of managerial decisions judged as being congruent. Thus, feedback information may be used to confirm a teacher's prejudgement of decision congruence.

Decision Rationale

The evidence obtained through this study leads to the conclusion that a teacher chooses a particular decision action for two major reasons: (a) expectations for students' states of mind, learning, and behaviour, and (b) estimates of the students' states of mind, learning, and behaviour. In the case of interactive instructional decisions, the expectations for students appear to centre upon the students' states of cognition and affect and the expectations for students' learning performance behaviours. When choices are made for the implementation of interactive managerial decisions, though, the expectations seem to focus upon the students' states of affect and interactive behaviours.

Although not investigated in this study, the data suggest that a relationship exists between the teacher's expectations of students and the estimates that the teacher forms of students' states of mind and behaviour in specific situations. Indeed, the findings of this study imply that a teacher's estimates of students are greatly influenced by the expectations that the teacher holds for his students.

Heuristic Techniques and Decision Making

An examination of the estimates and assessments formulated by this teacher leads to the conclusion that a teacher does employ heuristic techniques in the decision making process. The estimates that a teacher forms of his students' states of mind and behaviour appear to be based upon the teacher's expectations for students and the teacher's observations of student overt behaviours. Further, the behaviours that a teacher perceives may be interpreted in light of the expectations that the teacher holds for the students.

The findings of this study indicate that a teacher uses both low inference student behaviours--for example, walking around, shouting out, gross body movement--and high inference student behaviours--such as facial expressions, tone of voice, and changes in body stance--as some of the information used in the formulation of estimates of students' states of mind and behaviour. However, one of the more important findings is that once the estimate has been formed its validity is not checked.

This suggests that a teacher's formulation of estimates and assessments is based upon his interpretation of the meaning of student overt behaviours. Further, based upon the review of the literature presented earlier, the hypothesis may be postulated that these behaviours are interpreted through the beliefs that the teacher holds regarding teaching and students. Thus, given the evidence that (a) a teacher formulates interactive estimates through the observation of student overt behaviours, (b) a teacher usually does not check the validity of her interactive estimates of students or lesson strategies, and (c) a teacher's estimates of students and lesson strategies form the bulk of the information used in the formulation of interactive decisions, the conclusion may be drawn that a teacher makes considerable use of heuristic techniques in the formulation of interactive decisions.

Research Methodology

The findings relating to the use of stimulated recall with videotaping lead to the conclusion that this method is highly appropriate for uncovering introspective data, especially when investigating the decision processes of a classroom teacher. However, evidence indicates the need to involve the teacher, to some degree, in the study not only as a subject but also as a cohort. A teacher unfamiliar with the decision making paradigm will, in all likelihood, not provide the same degree of insight into his decision making as a teacher who is familiar with the paradigm and is able to discuss his decision processes in a knowledgeable way.

Indeed, it is highly probable that the richness of the descriptions supplied by the teacher was due, in part, to the fact that the researcher and the teacher engaged in lengthy discussions of the decision paradigm prior to the collection of data. Through this process the teacher was able to explore her own decision style and to develop an awareness of her role as a decision maker.

The question of data contamination through investigator intervention is relevant at this point. Evidence obtained through the analyses of the stimulated recall interview data and the videotape records of the teacher's behaviours in the classroom prior to and following these discussions indicates that there was no noticeable change in the teacher's behaviour that might be attributed to such intervention by the investigator.

A second question that must be addressed is that of data validity. Concern has been expressed in the literature that what a subject says in such interview sessions may not be accurate representations of either the actual behaviours exhibited or the rationales for those behaviours. Unfortunately, methods that would allow an examination of interactive thoughts at the time behaviour is implemented, such as think-aloud, are not appropriate for research into teacher interactive decision making. The caution that subjects of such studies may not be able or unwilling to articulate the motivations or rationales for their behaviours is well founded; however, at some point the assumption must be made that what the subject reports are representations of the perceptions he holds about his behaviour. Until we develop more precise tools for investigating interactive thoughts the ones we have must serve.

Implications

The findings of this study and the subsequent conclusions that have been drawn hold various implications for the publics that have interest in education in general and for those having specific interests in pre-service and in-service education for teachers, in educational administration, and in educational research. The following implications and recommendations reflect not only the findings and conclusions drawn from this study but also conclusions drawn from the review of the literature.

Implications for Teacher Education

As the literature suggests and this study has determined, teachers are dynamic decision makers and the act of teaching is "a decision making strategy" (Winne and Marx, 1977:669, 671). The implications of these views for teacher pre-service and in-service education are not new and have been stated previously (Clark and Peterson, 1976; Winne and Marx, 1977; Hargreaves, 1979; Sutcliffe and Whitfield, 1979) but in brief they focus on the need to develop more refined observational skills, greater awareness of students' behaviours and states of mind, and greater awareness of the interactive decision process.

One of the conclusions drawn from this study is that decision making is a cognitive process that may involve elements of the subconscious as well as the conscious. Implicit in this assertion is that teacher decision making is both skill and art; skill in the observations of student behaviour and the perceptions gained from these observations and art in the interpretation of these perceptions and in the resultant decision actions.

Thus several concerns must be addressed by those concerned with the teacher's role as decision maker and the role of teacher decision making in student learning, namely:

1. Generation of Decision Alternatives. It is unusual for teachers to be aware of the decision paradigm and of their roles as dynamic decision makers without previous training. Providing student-teachers with the opportunity to practice alternatives generation in a variety of decision situations may facilitate the development of a diversified strategy repertoire.

2. Awareness of Students States of Mind and Behaviour. The results of previous research indicate that teachers do formulate estimates of students' states of learning and

behaviour but that these estimates are not used in the interactive phase of teaching to optimize instruction (Farr and Brown, 1971; Clark and Peterson, 1977; Shavelson, et al., 1978). However, results from this study suggest that the majority of information used in the formulation of interactive decisions originates in the teacher's observations of student behaviours and in the subsequent estimates that are formed. This lack of agreement may stem from a deficiency in our knowledge of the way in which teachers form estimates and assessments of students' states of mind and behaviour. Once this knowledge is more complete, training teachers to develop specific awareness skills may perhaps lead to a more rational mode of teacher decision making. Training and experience in estimate formulation in controlled and unthreatening situations may help student and practicing teachers develop this skill without resorting to stereotypic techniques.

3. Beliefs and Values in Decision Making. The literature stresses the role that beliefs and values may play in decision making in general. However, very little investigation has been aimed at delineating the relationships between teachers' interactive decision making and teachers' beliefs and values. This area seems ripe for research.

Implications for Educational Administration

As March and Simon (1958), Janis (1963), Emory and Niland (1968), Radford (1975, 1977), Janis and Mann (1977) and Simon (1977) have observed, administrators are faced with two distinct types of decision situations: routine or programmed decision moments and non-routine or unstructured decision moments. Educational administrators, in their daily duties and activities, face a great many unstructured decision moments that often involve judgement, intuition, creativity and a great deal of uncertainty.

The findings of this study indicate that extant theories and understandings of decision making are not exactly complete or accurate. As such, until similar investigations of administrators' decision making are conducted, we will not be in a position to ensure that educational administrators will be highly skilled in at least the area of making decisions. This is particularly critical when it is widely acknowledged that decision making is at the heart of administration or management.

A second implication for educational administration lies in the area of teacher evaluation. Recent research findings lead to the suggestion that teachers, especially in the elementary grades, tend to focus more on processes within the classroom than to students' learning outcomes (Crocker, 1978). This research, furthermore, suggests that there is a significant relationship between process and pedagogical effectiveness, as expressed in such things as the amount of student involvement in the learning process and acceptance of student ideas and suggestions. If, as the literature suggests, evaluating process is an appropriate means of formatively evaluating student behaviours, then effectiveness measures focussing upon teacher estimate and decision formulation behaviours must be examined. The practical problems that educational administrators face in attempting to assess the process aspects of teaching require that the teacher play an active role in his own evaluation. Moreover, studies in cognitive and affective psychology provide ample evidence that changes in human behaviour will occur only when there is an understanding of the need for change and when there is a commitment to that change. Hence, then, it is crucial not only that the teacher's role as a dynamic decision maker be acknowledged but that his involvement in the evaluation process be encouraged too. In the final analysis it would appear that administrators who are responsible for supervising the quality of instruction need to become cognizant of decision making processes that are associated with effective teaching.

Implications for Educational Research

Educational researchers must also face the implications of this emerging perspective on the teacher as a dynamic decision maker. Presently, the research literature on human learning and human information processing in the educational context has only scratched the surface. However, these rich areas are too valuable to research on teaching and the evaluation of teaching to be ignored. If educational researchers accept teaching as a process and student learning as a function of student-teacher interactions, then this domain seems a profitable one to research.

As well, the involvement of teachers in studies of decision making must be encouraged. Educational research will profit from the acceptance of those in the field as partners in investigations of the teaching-learning process, rather than just the subjects. Given that one of the aims of educational research is to provide information that will ultimately be used in the development of appropriate pre-service and in-service teacher education programs, then the involvement of teachers in such research is crucial.

Finally, the use of introspective methodologies in educational research must be encouraged. To develop conceptualizations of effective teaching behaviours without determining what teachers actually do in the classroom is to ignore reality. The value of naturalistic, exploratory research in education must not be under-rated; it has the potential of providing much needed information concerning the teaching and learning processes.

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APPENDIX A: CONTENT ANALYSIS SYSTEM

APPENDIX A

Content Analysis System For Interactive Decisions (CAS)

The Content Analysis System for Interactive Decisions was developed specifically to facilitate the categorization of the subject teacher's interactive thoughts concerning her decision making during the observed lessons. The development of the CAS, its underlying rationale and the structure, have been influenced greatly by previous systems developed by Marland (1977), Conners (1978ab), and King (1979). However, the actual categories developed for use in this study are functions of the nature of the data collected and have been generated as a result of careful examination of the stimulated recall transcripts.

The Data

The data that were collected and analyzed in this study originated from the transcripts of the stimulated recall interviews. There were ten such interviews and each was conducted over a period ranging from 30 to 55 minutes. During the interviews, the teacher viewed the videotape records of her teaching in the observed lesson. While viewing the videotapes, the teacher was asked to report her thoughts and feelings concerning the decisions she formulated, including any thoughts and feelings concerning the students, the classroom or herself.

Following the teacher's report of her thoughts and feelings at each decision moment, she was usually asked questions that related to the information she was aware of at the time of the decision-making and her explanations for particular decision actions chosen. Thus, the data consist of more than just interactive thoughts.

The Content Analysis System

There are four distinct steps in the CAS. These procedures include:

1. The categorization of the stimulated recall interview transcript data into two distinct types: decision related and non-decision related data.
2. The categorization of decision related data into two distinct types: interactive and non-interactive data.
3. The segmentation of the interactive and non-interactive data into units of thought.
4. The categorization of thought units into categories that reflected the identified elements of interactive decisions, as identified during the analysis.

Decision Related Data vs Non-Decision Related Data

Decision related data consisted of those thoughts and reports that dealt specifically with the teacher's reports of her thoughts, feelings, and behaviours that occurred during the decision moment. Non-decision related data, then, consisted of those thoughts and reports that had no relevance to the teacher's decision making. Code as non-decision related data those reports that refer to outside school activities.

Examples:

T: We're not going to have any summer. It'll end up that we'll two or three months of summer and that will be the end of it.

T: My lunches are getting small each day.

T: I'm not all that excited about this other study that is being done . . .

T: . . . perhaps you'd like to go out for dinner with us at lunch time. Lots of people seem to dash away to the xxxxx, which is quite close.

Code as non-decision related data those reports of the teacher that relate to classroom activities but have no bearing on the decision moment:

Examples:

T: . . . this one that Mark is doing has just got me super puzzled. I guess I don't know whether he's really feeling your pulse or not or whether that's just a sideline. But it's a riot. I mean, I was really intrigued.

T: It's funny to see yourself (on the television monitor) and wonder what you're doing.

T: You sure can hear xx's (another teacher) voice on there (television monitor), eh?

T: But xxxx (another teacher) tries to, uh, on the "Cover to Cover" series, he tries to get the books that are on the particular series for that year into the library, so our kids can pick them up and read them after they've seen the program.

Interactive vs Non-Interactive Data

The second step in the CAS is to separate the interactive from the non-interactive decision related data. Although some non-interactive data were used as data in this study, most were not.

In the differentiation between interactive and non-interactive data, many clues from the transcripts were used. Examples of the clues that were used in identifying interactive data are:

T: I sort of wondered . . .

I: Can you tell me exactly what you were noticing about the kids?

T: I was noticing that a lot of them were just shuffling around their papers . . .

T: I sorta felt that the kids were ready.

I: What were you thinking at that point?

T: Ah, well I was trying to concentrate on what Amanda was telling me . . .

Similarly, many clues appeared in the transcripts that lightened the task of identifying non-interactive data that were not coded in the study.

Examples:

T: I don't recall.

T: I think I just sort of glanced around again at the girls . . .

T: . . . oh, I don't know. I just sort of wrote something down. I don't know what it was, though.

T: Oh, I guess I changed my mind.

As previously mentioned, some non-interactive data was coded for use in the study. Again, obvious clues to this type os data were found in the transcripts.

Examples:

T: . . . because earlier in the morning, you know, we'd sort of gone through this already . . .

T: I find that if they're really persistent in making a lot of noise and . . .

T: I've done this previously, you know, where he's said he doesn't want to do anything at all . . .

T: You know, I find that the less you say . . . it seems to be more effective.

In order the assist in the distinguishing of less obvious interactive and non-interactive data, a set of guidelines was used. These guidelines were initially developed by Marland (1977) and refined by Conners (1978a) and King (1979). As some of the non-interactive data collected in this study was coded for analysis, these guidelines required further refinement.

Guideline 1.

Label as non-coded, non-interactive data those reports of the teacher that referred to behaviours exhibited that were different from those that she might have exhibited in different situations.

Examples:

T: You know, usually I will ask them if this is what they want to do but I didn't this time.

T: Normally I would have helped her. But we just didn't have time this morning.

On the other hand, label as coded, non-interactive data those reports of the teacher that refer to behaviours exhibited that are similar to behaviours exhibited at other times.

Examples:

T: That's something I usually do . . .

T: I usually very often just ask that kind of question to see if the kids are paying attention.

Guideline 2.

Reports that indicate what the teacher would have done, if a student had exhibited a certain behaviour, are to be labelled as non-coded, non-interactive data.

Example:

T: You know, if he had had his hand up, I would have asked him.

Guideline 3.

Label as coded non-interactive data those reports that reveal information about the student or the lesson and that had a bearing upon the formulation of an interactive decision.

Examples:

T: *She's a very slow reader*, you know, so I thought that this would be good for her to read.

I: Why did you go on to that?

T: . . . well, *the author was born there and we* . . . *discussed it yesterday* . . .

Guideline 4.

Label as coded, non-interactive data reports that indicate the teacher's behaviour, either verbal or non-verbal, rather than the teacher's thoughts or feelings.

Examples:

T: So, at that point I said, "Sit down, Michael, right now."

T: And I said, "Yes, please do. Give it to me."

T: And so, as I read the question, I just said his name to draw his attention.

T: . . . I accepted his answer.

Note 1. Often reports by the teacher of what she said or did during the lesson indicated interactive decisions and were valuable in identifying decision moments and elements of the decisions.

Guideline 5.

Statements that reveal what the teacher saw, heard or perceived about the students, the classroom or the lesson and that have a bearing upon the formulation of an interactive decision are to be coded as interactive data.

Examples:

T: . . . so he said, "I've got it done; I'd like to get it marked."

T: . . . she was just sitting there . . .

T: I felt rushed. We had such little time left.

T: There were a lot of these big words in the list and I didn't want any more.

Guideline 6.

Label as non-coded, non-interactive data, those statements that reveal confusion or uncertainty on the part of the teacher.

Examples:

T: I don't . . . I think I was . . . no I don't remember.

T: I guess I was trying to . . .

T: I think that might have been . . .

Guideline 7.

In classifying reports or statements in the transcripts as either interactive, coded or non-coded non-interactive, the use of contextual clues will be most valuable. When obvious clues are not to be found, as in the previous examples, then it may be necessary to examine the lines prior, or subsequent to the statement or report under investigation.

Guideline 8.

When in doubt, classify the statement or report in the transcript as non-decision related.

Unitization

Unitization, the third step in the CAS, is the process of segmenting the interactive and coded non-interactive data into units of thought or ideas. Conners (1978a:352) refers to the unit as "a remark or series of remarks, which expresses a more or less complete idea, and serves a specified function." Conners' definition suggests that the thought unit may be a single word, a portion of a sentence, or an entire paragraph, so long as it contains a single thought or idea.

When indicating a thought unit, care must be taken to ensure that it is clearly delineated. This may be accomplished by: (a) enclosing the unit in parentheses, or (b) using the "cut-and-paste" method, physically removing the transcribed unit and placing it elsewhere.

Examples: (in parentheses)

I: Were you thinking of anything else you might have done?

T: Well, (ya). (I sort of thought, well, that I would quiz him further on it) and (then I decided not to.) (I thought, well, that's fine), you know. (He hasn't been a problem in the past with homework) and so on (and he's usually got it done.) So, you know, (I sort of decided that's fine), (I'll just give it to him) and . . . (and not pursue it any further.)

Other speech characteristics that are encountered in the transcripts have been termed by Conners (1978a:353) as "false starts" and "mazes". These, however, are not to be unitized, as they do not fall within the definition of a thought or idea unit. In the transcripts, these "false starts" or "mazes" may be dealt with in a number of ways. Two of the most effective are: (a) underlining, or (b) physically removing the transcribed false start or maze from the transcript.

Examples of "false starts": (underlined)

T: I was just . . . just getting . . . getting sorta disgusted with the, you know, uh, (was a little bit cross at Michael) (and his activities at the back) . . .
T: You know, (rather than just sort of leaving it) and (say, "Well, that's fine"), (I'll just deal with the people who are willing to pay attention) . . .

Example of a "maze": (underlined)

T: (I was also thinking about the fact that she may have been counting the zero as one), (rather than going to the next point). And so I, if she had been, if she had, you know, still was confused, I would have gone to the blackboard) . . .

Categorization

During the examination of the transcripts of the 10 stimulated recall interviews, each piece of interactive or coded non-interactive data was examined to determine the category into which it could fit. This process of categorization is the fourth step of the CAS. However, as Marland (1977:304) notes, "the distinction between the two stages of segmentation (unitizing) and categorization is blurred because the unit selected is best understood in terms of the categories. In fact, the categories largely establish the unit." Thus, although categorization has been discussed as a separate procedure, it was conducted concurrent with the unitizing process.

Each of the 8 identified categories of interactive decisions and elements of interactive decisions consists of a set of thought units that has one or more distinct and descrete characteristics. The 8 categories of interactive decisions and elements of interactive decisions are: (1) instructional decision, (2) managerial decision, (3) decision antecedent, (4) decision information, (5) decision alternative, (6) decision rationale, (7) decision feedback information, and (8) decision congruence.

The following is a brief description of the categories identified through the use of the CAS. Given the nature of this study and its purposes, these categories were subcategorized.

1. Interactive Instructional Decision

The category of "Interactive Instructional Decision" consists of statements or units in which the teacher's thoughts are focussed upon the delivery of instructional material or student learning and in which the teacher mentions the consideration of choice behaviour.

Examples: (in parentheses)

> T: . . . they weren't too sure yesterday and they had problems with . . . this stuff, so (I thought I would go back and ask those particular people, . . . that were having problems yesterday.) . . . So with Laura and Steve, you know, (I specifically asked them a question just to see if they were able to understand from yesterday.)

Care must be taken to ensure that the teacher's report mentions choice behaviour. That is, the teacher must say that he/she has indeed made a deliberate choice to implement a specific action. There are several clues within the transcripts that will facilitate the categorization of a decision. Examples of these context clues are:

> T: So, that was a conscious decision to do that at that time . . .

> T: . . . but I thought, well, I'll just mention it to them and . . . just sort of remind them of it.

> T: . . . and so, as I read the question, I just said his name to draw his attention . . .

However, other clues from the transcripts must be used to ensure that choice behaviour was exhibited. During the discussion of the decision moment, the teacher must indicate that the choice behaviour was in response to a stimulus.

2. Interactive Managerial Decision

An "Interactive Managerial Decision" may be revealed by a statement of conscious choice by the teacher to deal with the behaviours of students that are perceived to be dysfunctional, in that they interfere with or detract from the learning and/or instructional process.

Example: Interactive Managerial Decision (in parentheses)

T: O.K. . . . I've said it again. (I'd decided that I would). And then (I thought that I would sit without saying anything, waiting until everybody settled down).

As with instructional decisions, managerial decisions may be identified from context clues. Again, caution must be taken to ensure that the behaviour is in response to a perceived behaviour deviation or disruption.

3. Decision Antecedent

A decision antecedent is an event, behaviour or perception that stimulates the teacher's expressed need to formulate an interactive decision. In order to categorize the thought unit as a decision antecedent, the teacher must also state that he/she formulated a decision, as a result of the perceived stimulus or stimuli.

Example: Decision Antecedent (in parentheses)

I: Can you tell me what is happening there?

> T: Well, he made, you know, I said thank you for putting his book down and (he said, "Well, you're not welcome.") Uh, o.k. At that point I was sorta thinking, now should I just let it pass and not worry about it or say something. . . . I don't know why, but I decided to pursue it.

Stimuli that precipitate the formulation of decisions can be identified using contexual clues. Examples of these clues are:

> T: , . . when I did that, I noticed that he was chatting already . . .

> T: . . . ya, she was just sitting there and she was doing nothing . . .

> T: I didn't understand what he was trying to get at at all . . . at that particular time he just had me thoroughly confused.

4. Decision Information

A piece of decision information is a thought unit that focusses upon a piece of data or cue that the teacher uses in the formulation of an interactive decision. Caution must be taken to distinguish a thought unit that indicates information from that that indicates a decision antecedent or a decision rationale. An example of decision information is found below, in parentheses.

> T: (Same old story). (No more books left). Well . . . you know, (I still had Michael on my mind) and (I didn't particularly have any patience for Audrey at that point.) Um, so I asked Jennifer if she would, you know, go check in the other classroom and, . . . (she's pretty good about doing things like that.) (She . . . will have a good look, if, you know, there is a problem or something comes up.

Examples of clues in context that will facilitate the identification and classification of decision information are:

> T: This is what they were looking at . . .
>
> T: . . . and I find the kids, you know, draw to the overhead . . .
>
> T: . . . he didn't seem to be confused or anything . . .

Each of these pieces of information have a common characteristic. Each explains the teacher's perception without:

(a) describing it in terms of a stimulus, or

(b) using it as an explanation for a particular decision.

5. Decision Alternative

Label as decision alternative any thought unit that indicates that the teacher consciously considered another choice of action during a decision moment.

> Example: Decision Alternative (in parentheses)
>
> T: Well, I noticed a lot of chatting amongst one another and I think they were talking about the math itself and they . . . seemed . . . just sort of puzzled looks on their faces, so I thought that I would go back and sort of bring them back and realize what they were supposed to be looking for. . . . (I thought on several occasions of putting the shapes on the overhead, doing it that way and looking at them.) (I thought about it and then I sort of hesitated not to.) I'll continue with the book and see if I can . . . draw their attention from there.

Those statements that explain the options that occurred to the teacher during the interviews but not during the decision moment are to be labelled non-interactive, non-coded data. The following examples are to be labelled non-interactive, non-coded data:

> T: If certain students were still having lots of problems, or it seemed a group of them . . . I do it on the overhead.
>
> T: Well, there were several other students that I had the option of asking, as well . . .
>
> T: . . . it had crossed my mind earlier in the morning, just have the kids come up to the overhead and have them do it themselves . . .

The following thought units are to be labelled as Decision Alternatives:

> T: I had thought about it at the time but I decided that I really didn't want to have anybody write it down first and then check to see if it was right or wrong.
>
> T: I was going to ask Steven or Kelly or someone . . .
>
> I: Did you think of the photocopying at the time the decision was made?
>
> T: Yes, I did. . . . It was just sort of fleeting in and out. . . . I just sort of rejected it. Just said no.

6. Decision Rationale

Each report of a decision that the teacher formulated, with the exception of two, was accompanied with an explanation or a reason. The report, though, to be categorized as a decision rationale must be interactive. An explanation or rationale that is created during the interview but not thought during the formulation of the decision may not be considered a decision rationale. The following decision illustrates a decision rationale.

Example: Decision Rationale (in parentheses)

I: Why did you read that out, the instructions?

T: (I . . . sorta felt that I needed the chance to sort of get my thoughts together) and, . . . you know, and that gave . . . me a chance to sort of think about what I had planned earlier about what to do, sort of thing. . . . And at that point, you know, I still . . . hadn't emotionally calmed myself down enough that I could sort of think straight . . . . . (So I wanted to give myself the chance just to get organized, get my thoughts organized).

Decision rationales may be identified through the use of several clues found in the transcripts.

Examples: Decision Rationale Clues (underlined)

T: . . . and I wanted to sort of include him.

T: . . . just to sort of bring them back and realize what they were supposed to be looking for.

T: . . . to see if she could get that association across.

T: . . . that I could see that she was understanding what I was trying to get at.

T: . . . because it wouldn't disturb the other kids . . .

7. Decision Feedback

Label an interactive unit as Decision Feedback when it relates information that the teacher perceived, following the implementation of a decision. The following are examples of units labelled Decision Feedback:

Examples: Decision Feedback (in parentheses)

T: . . . and (then I saw he was ready to go), sort of thing.

T: . . . after I had spoken to them, I thought they might have paid more attention but (they were still talking).

T: . . . and (she said yes), (that she'd like to do it that way).

8. Decision Congruence

There are no thought units that directly indicate decision congruence. Decision congruence may be judged by the degree of congruity between the teacher's statements of intent, as demonstrated in the thought units involving decision rationale, and thought units concerning decision feedback information.

The judgment of decision congruence must be made using clues found in the transcript data. When the transcripts reveal units that express positive feedback, the judgment of congruence may be made. Often, though, there will be an absence of units expressing either satisfaction or dissatisfaction with the implemented decision. When neither positive nor negative decision feedback information units are available, the decision action taken is to be considered in congruence with the intent.

On the other hand, when the transcripts do not reveal units expressing negative feedback, the judgement of incongruence may not be made. The only occasions that a such decision may be made will occur when the transcripts reveal units that indicate negative decision feedback information.

APPENDIX B: THE CHRONOLOGY

THE CHRONOLOGY

Overview

The following is a sample of the chronology that was maintained during the videotaping of the ten lessons that formed the stimuli for the stimulated recall interviews. The purpose of the chronology was two-fold. First, it was designed to enable the recording of apparent decision moments, so that they could be easily referred to during the stimulated recall interviews. Second, the decision chronology was to serve as an instrument by which the investigator could compare his ability to identify interactive decision moments during the observation of the lessons with the teacher's ability to identify decision moments during the observations of her behaviours, recorded on video-tape.

The following sample displays five aspects of the chronology. The first two items that are displayed are the time that the decision moment was perceived and the number of feet into the videotape that the decision moment was perceived, respectively. Next, the column labelled "Observed Behaviours" details the behaviours of the teacher at the instant a possible decision moment was perceived and the behaviours immediately following the perceived decision point. Fourth, the "Comments" column records the investigator's thoughts at the moment the possible decision moment was perceived.

The fifth aspect of the decision chronology is to be found in this last column also. During the stimulated recall interviews, the investigator used the chronology to check his ability to identify the interactive decisions while observing teacher behaviour. Decision moments that were identified by both the teacher and the investigator are marked with an asterisk (*) in the "Comments" column. As well, additional thoughts are recorded; thoughts that the investigator recalled during the interviews.

Reading Lesson No. 2

TIME	VTR COUNTER	OBSERVED TEACHER BEHAVIOURS	COMMENT
9:45½	000	Ss return from library Tr: "O.K., let's quietly read for a few minutes, please. For five minutes or so until everyone else comes back." (D?)	- Instructional Decision or pre-planned - Preactive! "That's something I planned earlier."
9:46	009	Tr: Walks around room watching Ss. Looks at Tracey and Holly (talking) Tr: "Tracey and Holly, would you please save your conversation until later?" (D?)	- Managerial Decision? M.D.* - Not Satisfied

TIME	VTR COUNTER	OBSERVED TEACHER BEHAVIOURS	COMMENTS
9:47	018	Tr: looks at Tracey and Holly (still talking) Tr: "Girls, please" (Girls stopped talking) Tr: sorts through papers on desk. Continues to watch Tracey and Holly.	- Managerial Decision? * M.D.
9:50	049	Tr: asks Kelly to tell Laura to come back to class from library.	- Instructional Decision? - Asking Kelly? - Not Identified.
9:50	051	S: Approaches Tr. about missing assignment card from book. Tr: goes to card file and looks for book.	- Instructional Decision? - Not Identified.
9:51	057	S: Approaches Tr. complains of pains. Tr: Suggests S. see nurse in afternoon.	- Managerial Decision? - Not Identified.
9:51	059	S: Approaches Tr. asks if lesson started. Tr: Says yes and thanks S. for helping in library.	- Instructional Decision? - Not Identified.
9:52	061	S: asks about assignment in individual reading program. Tr: Asks S. to clarify question (D?). Tr: explains assignment to S. (D?)	- Instructional Decision? (a) to seek clarification? (b) to explain assignment? * - to explain assignment
9:52	069	S: Asks about getting book from library. Tr: "o.k. but please hurry. We're ready to go." (D?)	- Instructional Decision? (a) allow student to go to library? - Not Identified.
9:52½	071	Tr: invites Ss. to sit at front of classroom to watch T.V. program. Tr: gives Ss. option of sitting in desks.	- Interactive or Preactive? - Preactive "This is something I always do" Habit

TIME	VTR COUNTER	OBSERVED TEACHER BEHAVIOURS	COMMENTS
9:53	075	Tr: "Will you all please sit at the front?"	- changed mind? - interactive? - Not Identified
9:53	076	Tr: "Please sit down quickly, Stan. (D?)	- Managerial Decision? - Not Identified.
9:54	080	Tr: Watching Ss moving closer to T.V. Tr: "Boys, move back from the T.V. It will be too loud for you" (D?)	- Managerial Decision? *
9:54	081	S: Asks Tr when books (book club) will arrive. Tr: "When they get here. I'm no fortune teller."	- Interactive Decision or reaction? - Reaction. "I don't know why I said that."
9:54	084	Tr: Watching S with piece of paper. Tr: Asks S to put paper away. (D?)	- Managerial Decision? - Not Identified
9:54	086	Tr: Asks S to turn on program. Tr: Listens to program, asks S to turn up volume. (D?)	- Instructional Decision? - Not Identified.
9:55	098	Tr: Watches T.V., laughs Tr: "Must be a commercial" Tr: Looks at S. Ss: laugh	- Interactive Decision or Reaction? - Reaction!
9:57	121	Tr: Looks at 2-Ss Tr: "Laura and Sandy" (D?)	-Managerial Decision? - girls talking? *
9:58	147	Tr: Looks at S drawing with marker, returns to T.V. (D?)	- Null? - Not Identified.
10:00	170	Tr: Looks at S. Tr: "Stan, would you give me that, please? Come and sit over here with me." (D?)	- Managerial Decision? (a) take item away? (b) relocate *

TIME	VTR COUNTER	OBSERVED TEACHER BEHAVIOURS	COMMENTS
10:01	182	S: Asks Tr for permission to work on assignment during T.V. program. Tr: "No. That's homework. Please sit down." (D?)	- Interactive Decision or Reaction? - Reaction!
10:08	263	Tr: "Jennifer, will you come here please? Tr: Asks S to find book from library. (D?)	- Instructional Decision? - Choice of Student? - getting book - preactive? * choice of student
10:08	270	Tr: Begins discussion of T.V. program. Tr: Directs 3-Q's to students (D?)	- Instructional Decisions? (a) choice of students? -"I'm not aware of any reason why I chose those students."
10:09	274	Tr: Begins to form statement of purpose of T.V. program. - falters on words. S: Continues with Tr's statement. Tr: Motions S to continue.	- Instructional Decision? (a) choice of words? (b) acceptance of S? - Not Identified - "I wasn't aware of doing that. I wonder where my mind was."

APPENDIX C: LESSON SYNOPSES

LESSON SYNOPSES

Overview

The following are synopses of each of the observed lessons that were focussed upon during the stimulated recall interviews. Ten lessons were recorded on videotape and these were the recall stimuli. These lessons included, 3 mathematics, 3 reading, 2 spelling, 1 group discussion, and 1 language arts lessons.

Each synopsis has been organized into 7 sections: (a) Style, (b) Lesson Topic, (c) Instructional Mode, (d) Organization of Students, (e) Position of Teacher, (f) Pace of the Lesson, (g) Mood of the Lesson, and (h) Time Period of the Lesson. Each of these sections contains a short summary.

Lesson: Mathematics #1

Style: Whole Group Instruction

Lesson Topic: Introduction to Fractions

Instructional Mode: Teacher lecturing; questioning of students; use of overhead projector; individual seat work.

Organization of Students: Seated at desks; due to shortage of texts, some students sat in pairs.

Position of Teacher: Sitting at front of room on chair beside overhead projector.

Pace: Moderate

Mood: Moderately relaxed with periods of tension.

Time: 35 Minutes.

Lesson: Mathematics #2

Style: Whole Group Instruction

Lesson Topic: Review of Fractions

Instructional Mode: Questioning of students; individual seat work.

Organization of Students: Seated at desks; due to shortage of texts, some students sat in pairs.

Position of Teacher: Sitting on chair at front of room.

Pace: Rapid

Mood: Tense

Time: 43 Minutes.

NOTE: During this lesson, a coder involved in another research project was in the classroom observing the teacher's behaviours.

Lesson: Mathematics #3

Style: Whole Group Instruction

Lesson Topic: Fractions--review; Factors of Whole Numbers

Instructional Mode: Teacher questioning of students; individual seat work.

Organization of Students: Seated at desks.

Position of Teacher: Sitting on table at front of room; occasionally going to chalkboard to record student answers.

Pace: Moderate

Mood: Moderately relaxed with periods of tension.

Time: 46 Minutes.

Lesson: Reading #1

Style: Whole Group Instruction

Lesson Topic: Literature Appreciation

Instructional Mode: Viewing television program "Cover-To-Cover", program on literature appreciation.

Organization of Students: Seated on floor in front of television set.

Position of Teacher: Sitting in student's desk.

Pace: Slow

Mood: Relaxed

Time: 25 Minutes.

Lesson: Reading #2

Style: Whole Group Instruction

Lesson Topic: Introduction to Unit "Eric the Great" - Vocabulary Building.

Instructional Mode: Teacher questioning of students; discussion; teacher reading orally to students.

Organization of Students: Seated at desks.

Position of Teacher: Standing at front of room.

Pace: Rapid

Mood: Tense

Time: 33 Minutes.

Lesson: Reading #3

Style: Whole Group Instruction

Lesson Topic: Oral Reading--Reading Comprehension

Instructional Mode: Oral reading (students and teacher); discussion.

Organization of Students: Seated at desks and on floor in front of teacher.

Position of Teacher: Sitting at front of room on chair.

Pace: Medium

Mood: Moderately relaxed with periods of tension

Time: 35 Minutes.

Lesson: Spelling #1

Style: Whole Group Instruction

Lesson Topic: Syllabication and Vocabulary Extension

Instructional Mode: Teacher questioning; individual seat work.

Organization of Students: Seated at desks.

Position of Teacher: Pacing at front of room.

Pace: Rapid

Mood: Tense.

Time: 35 Minutes.

Note: The teacher was conscious of noise coming from the next classroom. During the lesson she made frequent references to that noise.

Lesson: Spelling #2

Style: Large Group Instruction; Individual Activity

Lesson Topic: Final Dictation--Spelling Unit

Instructional Mode: Teacher dictation of week's spelling words; questioning students on correct spelling of words.

Organization of Students: 22 students seated at desks; 6 students involved in individual activities.

Position of Teacher: Sitting on table at from of room.

Pace: Slow

Mood: Relaxed

Time: 40 Minutes.

Lesson: Group Discussion

Style: Whole Group Discussion

Lesson Topic: Decision Tree - Discussion of Topics of Interest to Students - Prison and Rehabilitation.

Instructional Mode: Discussion; teacher questioning;

Organization of Students: Seated at desks.

Position of Teacher: Sitting on chair at front of room.

Pace: Moderate

Mood: Moderately relaxed with periods of tension.

Time: 48 Minutes.

Lesson: Language Arts

Style: Whole Group Instruction; Discussion

Lesson Topic: Pronouns--use in sentences.

Instructional Mode: Teacher questioning; discussion; individual seat work.

Organization of Students: Seated at desks.

Position of Teacher: Standing at front of room; Seated on chair at front of class.

Pace: Moderate

Mood: Relaxed

Time: 32 Minutes.

APPENDIX D: EXPLANATION FOR THE CHANGE IN STUDY DESIGN

EXPLANATION FOR THE CHANGE IN STUDY DESIGN

Original Design

This study was originally designed to explore a teacher's interactive decision making at two different times in the school year: the Spring and the Fall. The reason for this two stage data collection was to determine if there were any differences in interactive decision making at these times. When the subject was initially approached with this proposal, she accepted it without question. At this time, the teacher was informed that, although she was being asked to make a commitment of her time, she could withdraw from the study at any time, if she felt uncomfortable or if she could no longer commit the time to which she earlier agreed.

At the close of the first round of data collection, May, 1979, the teacher was asked if she wished to continue with the second round of data collection, to commence on the first day of the new school year, September, 1979. The teacher agreed to continuing with the study into the new year. In August, 1979, the teacher was again contacted, this time to arrange a time for her and the investigator to meet and discuss the second round of data collection. At this time, the teacher expressed her concern about continuing with the study and requested that she not be involved any further. It was at this point that the study design was altered.

Explanation for the Change

In an attempt to discern the reason for the teacher's reluctance to continue with the second round of data collection, the investigator sought and received help from a research officer with the Centre for Research in Teaching (CRT), University of Alberta. This researcher conducted an informal interview with the teacher in the Fall of 1979. The purposes of this interview were to (a) determine the reasons for then teacher's reluctance to continue with the study and (b) determine the teacher's perceptions of the study as it was conducted and of the interactive style of the study investigator.

In order to maintain the confidentiality of the teacher, the researcher from the CRT did not obtain a verbatim record of the interview with the teacher but did recreate the main issues discussed in the interview and did record perceptions that she had concerning the teacher's comments made during the interview. The following is a summary of those issues and perceptions.

Explanations

During the last month of the 1978-1979 school year, the teacher experienced both personal and professional difficulties. These had negative influences upon her views of teaching and her views of herself as a teacher. Thus, towards the beginning of the new school year, the teacher wanted to develop what she perceived to be a more healthy classroom climate, with as few outside interruptions as possible. It was with these thoughts in mind that she reluctantly removed herself from the study.

However, in the interview with the CRT researcher, the teacher stated that she had enjoyed her involvement with the study. She claimed that it was a valuable learning experience and that she would recommend such involvement to others. As well, she felt that the study investigator exhibited an empathetic style that encouraged her to feel comfortable and easy during the stimulated recall interviews.